

The Impact of Diabetes on the Commonwealth of Kentucky

2005



Kentucky Department for Public Health
Chronic Disease Prevention and Control Branch
Kentucky Diabetes Prevention and Control Program



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University of Kentucky College of Public Health
in collaboration with the
Kentucky Diabetes Prevention and Control Program
Department for Public Health



Acknowledgements

Many individuals and organizations helped make this document possible. The authors wish to thank the individuals listed below for their consultation and support in reviewing and commenting on this report.

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Funding for this document was provided by the Centers for Disease Control and Prevention, Division of Diabetes Translation (Cooperative Agreement U32/CCU400339)

Table of Contents

Acknowledgements.....	2
Foreword.....	4
Kentucky Diabetes Prevention and Control Program.....	5
Executive Summary.....	6
Kentucky Demographics.....	7
Overview of Diabetes.....	8
Diabetes in Children and Adolescents.....	14
Diabetes Prevalence in Adults.....	16
Diabetes Mortality.....	36
Hospitalizations Due to Diabetes.....	41
End-Stage Renal Disease.....	55
Technical Notes and Data Sources.....	63
Glossary.....	66
Kentucky Map.....	67
Fact Sheets.....	68

Foreword

Diabetes is a common, serious, costly, yet controllable clinical and public health problem facing Kentucky and our nation. Current data indicates that Kentucky ranks 7th in the nation in the largest percentage of adults diagnosed with diabetes. In addition, forty percent of all Kentuckians age 40-74 are estimated to have pre-diabetes putting them at high risk for heart disease and of future development of diabetes. In Kentucky, diabetes is the fifth leading cause of death by disease, and is responsible for numerous devastating complications (e.g., blindness, lower extremity amputation, kidney failure, heart disease, stroke). Direct and indirect costs are estimated to be 2.9 billion dollars annually.

Kentucky has been fortunate to have visionary leaders within the diabetes arena who recognized the burden of diabetes and sought federal and state funding to mount a public health effort to battle this disease. The Kentucky Diabetes Prevention and Control Program (KDPCP) will celebrate its twenty-fifth anniversary this year. KDPCP initiatives have focused on mobilizing state and local partners; training health professionals and individuals with diabetes to better manage the condition; and changing the diabetes health care system to improve outcomes for individuals with or at risk for diabetes.

The Diabetes Prevention Trials have now proven that type 2 diabetes can be delayed or prevented. Even though the KDPCP and its partners have always included education regarding healthy nutrition and physical activity for the control of diabetes, increased efforts and resources will be needed to address the prevention of new cases of diabetes. Since obesity and lack of physical activity are major risk factors for type 2 diabetes, our state will need to enhance its collaboration with partners working to address these issues.

In reviewing the Kentucky diabetes data, it is clear that research advances in diabetes are not being consistently and effectively translated into practice. Furthermore, the health care system, which is mainly designed to treat acute and episodic illnesses, will need to develop new efforts to manage a complex, multi-system, chronic disease like diabetes. One-to-one relationships between patients and their physicians, although critical, are not enough to address the burden of this disease, or slow the dramatic increase in obesity. A statewide, population-based effort including a broad range of partners must be continued and strengthened to bring about the multi-level, multi-system and multi-faceted community and health system changes necessary to narrow the gap between the current and desired diabetes care and prevention practices in Kentucky. Such an approach, with special attention to culturally appropriate interventions, is vital to impacting the twin epidemics of diabetes and obesity.

The data presented within this document illustrate that diabetes remains a significant public health problem. Although progress has been made, significant challenges remain. Continued and more extensive collaboration among entities of the entire "Kentucky Diabetes System" are needed to truly impact Kentuckians with or at risk for diabetes. We look forward to collaborating with you in this effort.

William D. Hacker, MD, FAAP, CPE
Commissioner, Department for Public Health



Kentucky Diabetes Prevention and Control Program

The Kentucky Diabetes Prevention and Control Program (KDPCP) is a public health initiative supported by federal funds from the Centers for Disease Control and Prevention (CDC) as well as state funds. The program includes a network of state, regional and local health professionals. The state staff are housed within the Cabinet for Health and Family Services, Department for Public Health in Frankfort, KY. The regional and local staff are located in district and local health departments across the state.

The mission of the KDPCP is to reduce the new cases of diabetes as well as sickness, disability and death associated with diabetes and its complications. To accomplish this mission, the KDPCP works with a variety of state, regional and local partners from both the public and private sector to do the following:

- **Community Mobilization**

Mobilize local and state partnerships to identify and positively impact diabetes-related issues.

- **Public Awareness**

Promote state and national diabetes campaign materials and messages to the public.

- **Community Group Education**

Provide classes to inform, educate and empower those with or at risk for diabetes.

- **Professional Education/Quality Improvement**

Facilitate efforts to improve access to quality care for those with or at risk for diabetes.

- **Surveillance and Evaluation**

Monitor data to assess the impact of diabetes, plan appropriate interventions, and evaluate the effectiveness of program efforts.

For more information about the program, contact the KDPCP at: (502) 564-7996. For details about diabetes-related activities in your area, contact your district/local health department.

Executive Summary

Diabetes is a major public health problem in Kentucky, affecting an estimated 8.5% of the adult population in 2003. It is the sixth leading cause of death in the state. Kentucky ranked seventh among the 50 states for the highest prevalence of diabetes in 2003. The percent of adults in Kentucky reporting that they have been diagnosed with diabetes has steadily risen since the mid-1990s. Although this reporting may be related to increased diagnosis of previously unrecognized diabetes or changes in the diagnostic criteria for diabetes, this trend is expected to continue into the near future because of population characteristics and the rising prevalence of certain lifestyle risk factors for the disease.

Prevalence of diabetes is higher among specific Kentucky populations, especially men, individuals of African American descent, and those living in the Appalachian region of the state. The older population (age ≥ 65) is especially at risk, and as the population ages, overall prevalence in the population can also be expected to increase. Death rates due to diabetes are also higher among men and African Americans in Kentucky. In fact, the age-adjusted death rate due to diabetes for African Americans (64.9 per 100,000) in 2002 was more than twice the comparable rate for the White population (29.4).

Obesity and lack of exercise are major lifestyle risk factors for the development of type 2 diabetes. In 2003, nearly two-thirds (63%) of Kentuckians were considered overweight or obese, and 31% reported no leisure physical activity in the past month.

Complications caused by diabetes pose serious problems in the Commonwealth of Kentucky. Specific problems include diabetic ketoacidosis, non-traumatic lower extremity amputations, cardiovascular and cerebrovascular disease, and end-stage renal disease. Data in this report show that these and other complications create an additional burden on the health care system in Kentucky. During 2002, there were 96,320 diabetes-related hospitalizations in the state.

Direct and indirect costs due to diabetes in the Commonwealth were estimated at \$2.9 billion in 2002. These costs and the impact of diabetes on the population can be reduced through modification of lifestyle risks, early diagnosis, appropriate health care, and informed self-care.

Kentucky Demographics

Living in Kentucky

The 2000 Census estimated Kentucky's population to be 4,041,769. Just over half (51%) the population is female and 13% is age 65 and older. The population is mostly White (90%) and just over half (51%) live in rural counties. About 26% of Kentuckians over age 25 have not completed a high school education, and an estimated 15.8% of the population lives below poverty (2000 Census). The Black population accounts for 7% of the state's population. This population is concentrated in the two major metropolitan areas of Lexington and Louisville. The Hispanic population in Kentucky is small but growing, accounting for 1.5% of the population according to the 2000 Census. The 51 eastern Kentucky counties designated as Appalachian by the Appalachian Regional Commission (ARC) contain 28% of the state's population. The Appalachian area is predominantly rural and white, with some counties reporting less than one percent minority population. One hundred of Kentucky's 120 counties (83%) are considered completely or partially medically underserved; forty-eight out of 51 Appalachian counties in Kentucky (94%) are medically underserved.¹

Health Care Coverage

According to the Kentucky Behavioral Risk Factor Surveillance System (BRFSS), the percent of adults who had some type of health care coverage in Kentucky has changed very little since 1995, staying at about 86% and then dropping to 81% in 2002 but increasing slightly to 83% in 2003. Among individuals diagnosed with diabetes, 90% reported having health care coverage during 2003.

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<http://bphc.hrsa.gov/databases/newmua/>

Overview of Diabetes

Diabetes is a serious, common, costly and growing public health problem. Diabetes affects more than 18 million Americans, or approximately 6% of the US total population (all ages).¹ An estimated 29% of all individuals with diabetes are unaware they have the disease, leaving them vulnerable to serious complications with long-term health consequences.² Every year approximately 1.3 million new cases of diabetes are diagnosed in people ages 20 and older,¹ and the prevalence (number of existing cases) is expected to double by the year 2050.³ For individuals born in 2000, the estimated lifetime risk of developing diabetes is 32.8% for males (about 1 in 3) and 38.5% for females (about 2 in 5).⁴ Rising rates of diabetes are attributed to increases in related risk factors such as obesity and lack of physical activity. Diabetes is costly not only in terms of decreased quality of life, but in terms of health care and related costs, which are estimated at \$132 billion per year nationally; direct health care costs are estimated at \$92 billion, while an additional \$40 billion includes indirect costs such as disability, time lost from work, and premature death.¹ The average yearly medical cost for an individual with diabetes was \$13,243 in 2002, five times higher than a person without diabetes.³

What is Diabetes?

Diabetes mellitus is a group of chronic, metabolic diseases characterized by high levels of glucose in the blood which results when the body does not use or produce insulin properly.⁵ It is a systemic disease which affects the body's metabolism and which can lead to damage of certain organs, especially the eyes, kidneys, heart, blood vessels and nerves. Glucose, which is produced in the body from the components of the foods we eat, is an important source of energy. Insulin, a hormone produced by the pancreas, helps regulate the balance of glucose in the blood stream. Too much glucose in the blood indicates pre-diabetes or diabetes.

Types of Diabetes

Diabetes mellitus includes three major types of diabetes: type 1, type 2, and gestational diabetes. Pre-diabetes, although not a diagnosed type of diabetes mellitus, is described here because many people with pre-diabetes will develop diabetes later.

Type 1 diabetes. Type 1 diabetes, previously known as insulin-dependent diabetes mellitus (IDDM), type I diabetes, or juvenile-onset diabetes, accounts for 5-10 percent of those with diabetes. It develops most often in childhood and adolescence, but can occur at any age. Type 1

diabetes results from the body's failure to produce insulin.⁵ Individuals with type 1 diabetes have a genetic predisposition to its development, but poorly understood environmental factors may also play a part. People with type 1 diabetes require insulin from an outside source to survive. Making wise food choices, exercising regularly, taking medicines as prescribed, controlling blood pressure and cholesterol, and participating in self-management education and training are also part of controlling type 1 diabetes.

Type 2 Diabetes. Type 2 diabetes, previously known as non-insulin-dependent diabetes mellitus (NIDDM), type II diabetes, or adult onset diabetes, accounts for about 90-95 percent of all cases of diabetes.³ It is more common among adults, but a growing number of children and adolescents are being diagnosed with type 2 due to the risk factors of obesity and lack of physical activity. In individuals with type 2 diabetes, the body does not produce enough insulin (insulin deficiency) or the cells do not properly use the insulin (insulin resistance).⁵ Treatment for people with type 2 diabetes typically includes taking diabetes medicines (if prescribed), making wise food choices, exercising regularly, controlling blood pressure and cholesterol, and participating in self-management education and training.

Although not present in all individuals who develop it, the following risk factors are associated with the development of type 2 diabetes:

- family history of diabetes
- pre-diabetes (impaired fasting glucose or impaired glucose tolerance)
- overweight/obesity
- lack of physical activity
- age 45 and older
- race or ethnicity, especially people of African American, Hispanic, Native American ancestry, and some Pacific Island racial/ethnic groups
- history of gestational diabetes or having a baby over nine pounds at birth
- high blood pressure (hypertension)
- HDL cholesterol 35 mg/dl or less and/or triglyceride level of 250 mg/dl or higher
- polycystic ovarian syndrome
- history of vascular disease.

Gestational diabetes mellitus (GDM). GDM is a blood glucose intolerance that is first recognized during pregnancy. It affects about 4% of pregnant women in the US, but the prevalence may vary depending on the population studied.⁶ Risks associated with GDM include the development of high blood pressure during pregnancy and development of an overweight fetus, which can complicate delivery. Although the elevated blood glucose associated with GDM is temporary and usually goes away after delivery, women with GDM are at increased risk for developing type 2 diabetes after pregnancy and should be tested regularly. Risk factors associated with the development of gestational diabetes include:

- marked obesity
- personal history of GDM
- strong family history of diabetes.

Pre-diabetes. Pre-diabetes describes blood glucose levels higher than normal, but not high enough to be diagnosed as diabetes.⁵ This condition includes impaired glucose tolerance (IGT) or impaired fasting glucose (IFG), or both and is a major risk factor for type 2 diabetes, as well as cardiovascular disease. A study by CDC showed that 40.1% of adults ages 40-74 (or an estimated 41 million people) in the US had blood sugar levels indicative of pre-diabetes.¹ Extrapolating to Kentucky's population, an estimated 611,000 Kentuckians ages 40-74 may have pre-diabetes and are at very high risk for developing diabetes. About 50% of individuals diagnosed with pre-diabetes develop type 2 diabetes within 10 years.⁷ However, studies have definitively shown that type 2 diabetes can be delayed or prevented by modest weight loss through diet modification and moderate exercise such as walking 30 minutes per day at least five days per week. The risk factors for pre-diabetes are similar to those for type 2 diabetes.

Signs and Symptoms of Diabetes

The signs and symptoms of diabetes can vary from person to person and some may have no symptoms at all. Symptoms of type 1 diabetes usually develop over a short period of time. Symptoms of type 2 diabetes develop more gradually and a person could have diabetes for a long time without knowing it. The most common signs and symptoms of diabetes include:

- frequent urination
- excessive thirst
- fatigue

- extreme hunger
- unusual weight loss
- sores that heal slowly
- blurred vision
- dry, itchy skin
- tingling or numb feet.

What are the Complications of Diabetes?

Diabetes can cause damage to various organs of the body, such as the eyes, heart, blood vessels, kidneys, and nerves. People with diabetes are also at higher risk for other diseases, including periodontal (gum) disease, heart disease, and stroke and they are more likely to have high blood pressure, high blood fats, and to be obese. In fact, heart disease is the leading cause of death for people with diabetes.¹ Diabetes is the leading cause of blindness in people 20 to 74 years of age and the most common cause of end-stage renal disease (ESRD).¹ Damage to the blood vessels and nerves make diabetes the most common cause of non-traumatic lower limb amputations.¹ Poorly controlled diabetes before and during pregnancy can cause major birth defects that are the leading cause of morbidity and mortality in infants of mothers with type 1 and type 2 diabetes. Finally, people with diabetes may acquire other illnesses such as influenza and pneumonia more easily and more severely than those without diabetes.

Many of these complications can be prevented. Early diagnosis, appropriate health care, and effective self-management can reduce the risks of developing serious complications and improve the quality of life for individuals living with diabetes.

Diabetes in Kentucky

As is the case nationally, diabetes is a major problem in Kentucky that continues to seriously impact the health of our residents. It was the sixth leading cause of death, and the fifth leading cause of death by disease, in Kentucky each year during 1999-2002. Because Kentucky does not have a registry for diabetes, we do not know exactly how many residents have been diagnosed with the disease, and we are unable to follow individuals' progression of the disease and its related complications. This report uses available data sources to put together the picture of the

impact of diabetes in Kentucky. These sources include health survey, hospitalization, mortality, and end-stage renal disease data. Without a registry, we can only estimate the percent of adults who have diabetes using statewide survey data. According to the 2003 Kentucky Behavioral Risk Factor Surveillance System (BRFSS), an estimated 8.5% of Kentucky's adult population has diabetes, which is slightly higher than the national average of 7.1%.

Extrapolating from 2003 BRFSS data, an estimated 267,000 Kentucky adults over age 18 have been told that they have diabetes, based on the Kentucky population estimate for 2003. A study based on National Health and Nutrition Examination Survey (NHANES) data estimates that 29% of all diabetes cases are undiagnosed.² Applying this percentage to the 2003 prevalence estimate, an additional 109,000 Kentucky residents aged 18 and older may be living with undiagnosed diabetes. Furthermore, 0.5% of adult females reported being diagnosed with pregnancy-related, or gestational, diabetes in 2003, according to the BRFSS; the national average is slightly higher at 0.7%. The estimated cost for direct medical care and indirect loss of productivity due to diabetes in Kentucky in 2002 was \$2.9 billion.⁸ These figures clearly show that diabetes is a serious clinical matter as well as a priority public health issue.

The good news is that outcomes for people with, or at risk for, diabetes can be improved with effective use of preventive measures and available therapeutic strategies to improve glucose, lipid, and blood pressure control. Data from the BRFSS show some improvements in reported diabetes self-management practices and reductions in the disparities among African American, senior and Appalachian populations and the rest of the population in Kentucky on most measures, but further progress is still needed. While the improvement in preventive-care practices among people with diabetes is good news, there is still work to be done and the high rate of overweight and obesity among Kentucky's population (nearly two of every three adults are overweight or obese) along with low amounts of reported physical activity, puts our residents at high risk for developing diabetes.

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Diabetes in Children and Adolescents

According to national data from the Centers for Disease Control and Prevention (CDC), an estimated 206,000 individuals less than 20 years old have diabetes.¹ This represents 0.25% of people in this age group.¹ Applying this percentage to Kentucky's population under 20 (Census 2000) suggests that approximately 2,784 children and adolescents have diabetes. According to national estimates, one in every 400 to 500 youth has type 1 diabetes.¹ When diabetes occurs during childhood, it is routinely assumed to be type 1, but studies indicate type 2 diabetes is becoming more common among youth.¹ Although there are no national data to monitor this trend, some clinics report that one-third to one-half of new cases of diabetes in youth are type 2.² This increase in the diagnosis of type 2 diabetes at younger ages is of particular concern because of the increased burden it represents on the health and quality of life of Kentuckians.

Children and Adolescents at Risk for Diabetes

Sedentary lifestyle, overweight, and family history are risk factors for the onset of type 2 diabetes. National data indicate the prevalence of overweight among children and adolescents was fairly stable during the 1960s to 1980, but since then it has been increasing. In children (ages 6-11) the prevalence of overweight has more than doubled from 6.5% (1976-1980) to 15.3% (1999-2000), and in adolescents (ages 12-19) the prevalence has tripled from 5.0% (1976-1980) to 15.5% (1999-2000).³ The national prevalence of overweight in even very young children (ages 2-5) has increased from 10.7% in 1993 to 14.3% in 2002, according to the Pediatric Nutrition Surveillance System which collects data on children enrolled in federally funded programs serving low-income children (such as Women, Infants and Children [WIC]).⁴ In Kentucky the prevalence of overweight among 2-5 year-olds was 16.8% in 2002, higher than the national prevalence.⁴

The Kentucky Youth Risk Behavior Survey (YRBS), sponsored by the CDC and conducted by the Kentucky Department of Education, is used to monitor various health behaviors among teens.⁵ The survey is conducted every other year in a representative sample of public high schools. The YRBS for 2003 indicated 15% of the high school students reported a height and weight consistent with being overweight.⁵ Similarly, self-reported data from the 2002 Youth Tobacco Survey showed 16.8% of Kentucky middle school students and 13.8% of Kentucky high school students being overweight.⁶

Because sedentary lifestyle is a risk factor for diabetes as well as overweight and obesity, it

is important that children get enough exercise. However, in 2003, 79% of public high school students in Kentucky did not participate in sufficient moderate physical activity.⁵ These trends foreshadow a continued rise in diabetes prevalence and other associated health problems unless drastic changes are made in the nutrition and exercise habits of children.

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Diabetes Prevalence in Adults

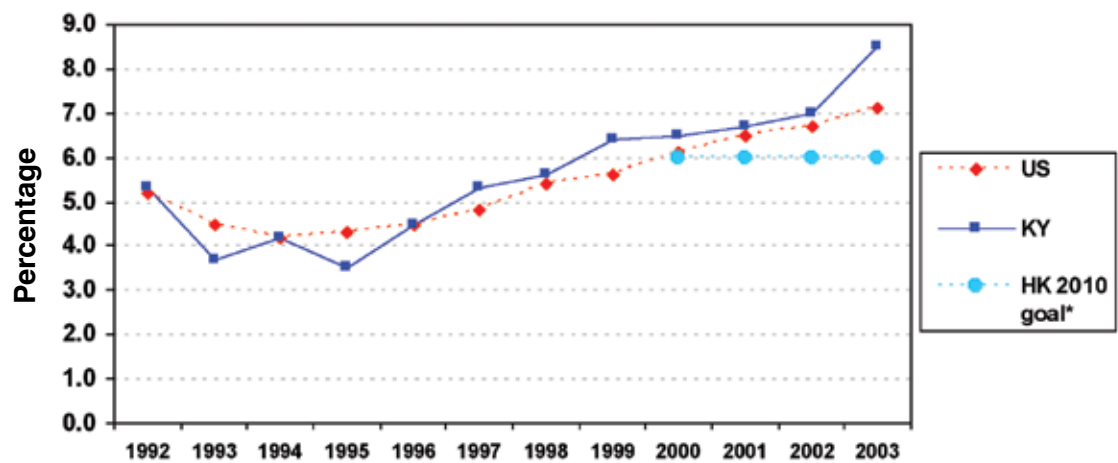
Data from the Kentucky Behavioral Risk Factor Surveillance System (BRFSS) are used in this section to estimate the prevalence of diabetes and related risk factors. The BRFSS is an annual telephone survey of adults (18 years and older) concerning their personal health behaviors. (See Technical Notes for a further explanation of the BRFSS.) All respondents are asked “Have you ever been told by a doctor that you have diabetes?” Those that respond “yes” are asked a series of questions pertaining to diabetes preventive-care behaviors. The results presented here represent only respondents who reported having types 1 and 2 diabetes. Those reporting gestational diabetes are excluded from the analysis. Racial comparisons using the BRFSS data include only White and Black; the number of respondents who indicated a race other than White or Black was too few to be analyzed separately. In this analysis, race was not broken down into subcategories by Hispanic ethnicity; therefore, the categories for White and Black include respondents who may have indicated Hispanic ethnicity as well.

Prevalence

In the past decade, the percent of Kentuckians who reported being told by a doctor that they have diabetes increased from a low of 3.5% in 1995 to a high of 8.5% in 2003 (Figure 1). This increase in prevalence since the mid-1990s is mirrored in the national data as well, although the percent in Kentucky was slightly higher than the US during 1997-2003 (Figure 1). The increase in diagnosed cases may be due to several factors, including a raised awareness of the signs and symptoms of diabetes and subsequent diagnosis; a change in diagnostic criteria in 1997¹; and, diagnostic testing that has become easier and quicker to perform. The prevalence of diagnosed diabetes in recent years in Kentucky is above the Healthy Kentuckians 2010 objective of no more than 6% of adults with diagnosed diabetes.² In 2003, Kentucky ranked seventh among the states (in a tie with two other states) for the highest percentage of the population with diagnosed diabetes.

Extrapolating from 2003 BRFSS data, an estimated 267,000 Kentucky adults (18 and older) have been told they have diabetes, based on the 2003 population estimate. Nationally, it is estimated that 29% of diabetes cases may be undiagnosed.³ Using this figure, an additional 109,000 Kentucky adults may have diabetes and not know it. Based on these estimates, approximately 376,000 Kentucky adults may have diagnosed or undiagnosed diabetes.

**Figure 1. Prevalence of Diagnosed Diabetes
US and Kentucky 1992-2003**



Source: Centers for Disease Control and Prevention,
Behavioral Risk Factor Surveillance System⁴

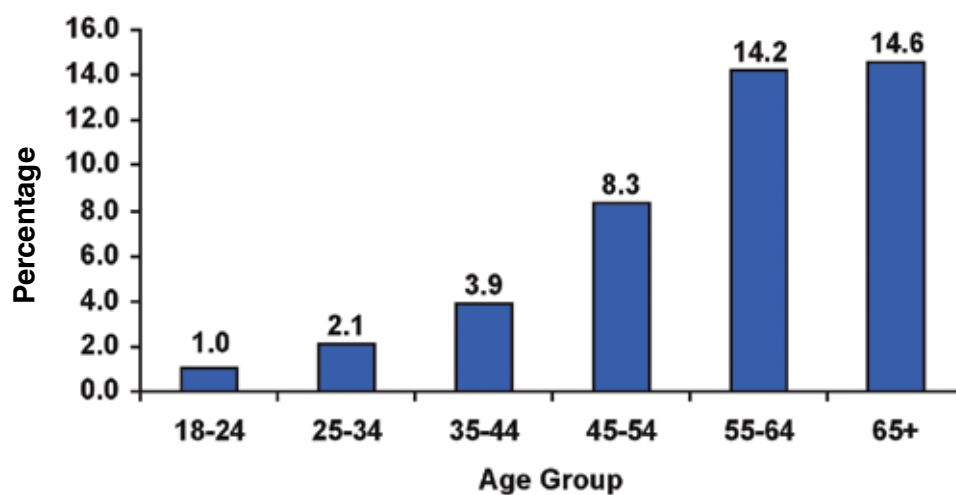
*Healthy Kentuckians 2010, Objective 18.2: Decrease the prevalence of diagnosed diabetes to six percent of the adult population.

In a separate analysis of gestational diabetes, the prevalence in Kentucky has been the same or lower than the national average since 1995. The prevalence has varied from a low of 0.3% to a high of 0.8% in Kentucky compared to a low of 0.6% to a high of 0.9% nationwide. Most recently, the prevalence was 0.5% in 2003, compared with 0.7% for the national average.

The prevalence of diabetes increases with age; that is, diabetes is more common among the older population (Figure 2). For 2000-2003, when ages 18-44 are combined, the prevalence of diagnosed diabetes was 2.5%, which was considerably lower than the prevalence in the older age groups: 14.2% for ages 55-64 and 14.6% for ages 65+.

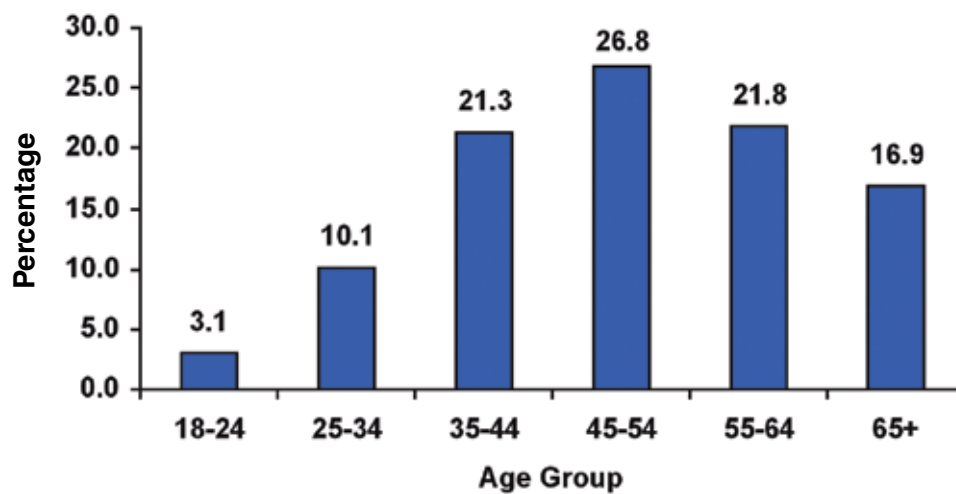
Figure 3 shows the age at which respondents said they were diagnosed with diabetes. People were diagnosed with diabetes most often during the ages of 35-64, with about one-quarter (26.8%) of all Kentuckians with diabetes being diagnosed between the ages of 45 and 54.

**Figure 2. Diabetes Prevalence by Age Group
Kentucky 2002-2003**



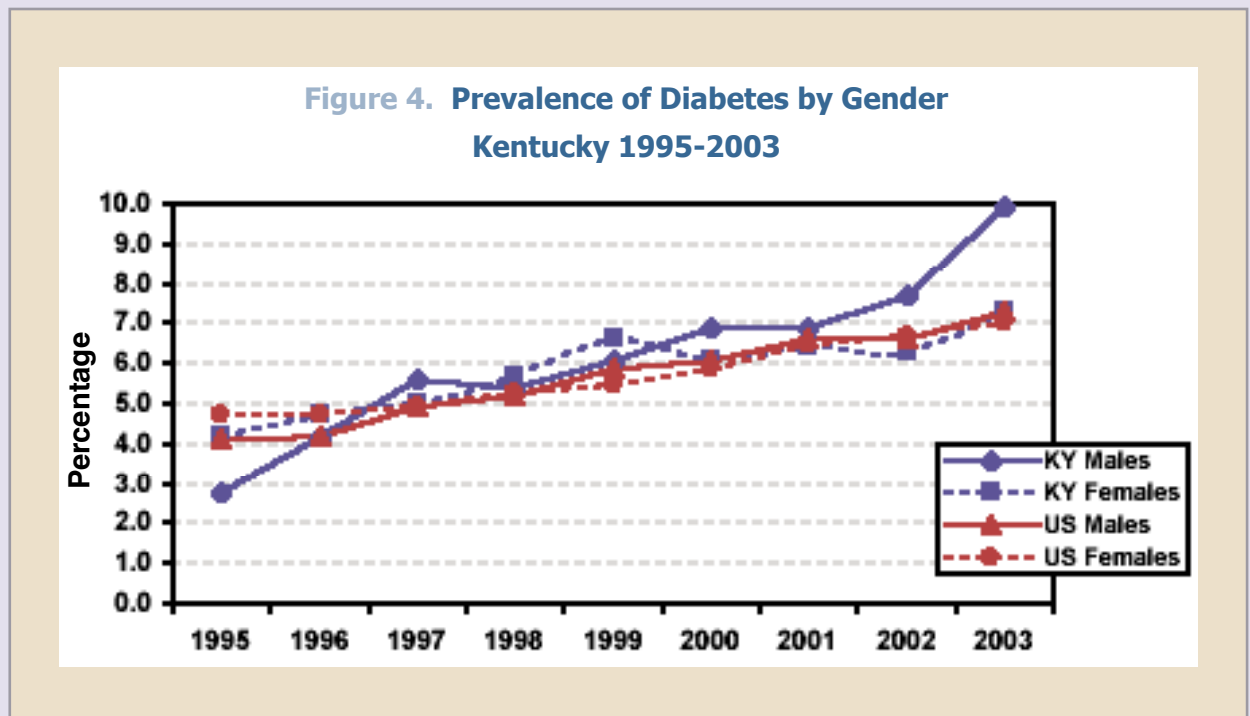
Source: Kentucky Behavioral Risk Factor Surveillance System

**Figure 3. Age at Diagnosis of Diabetes
Kentucky 2000-2003**



Source: Kentucky Behavioral Risk Factor Surveillance System

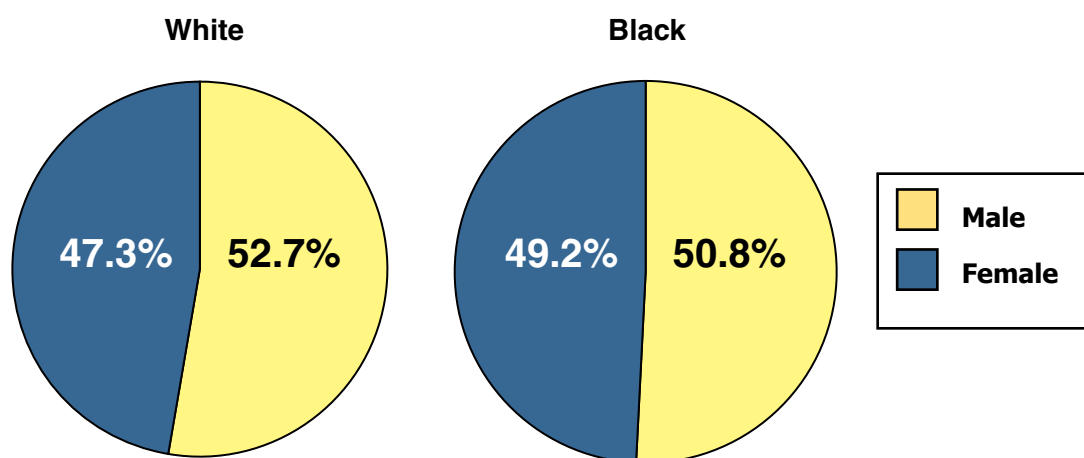
In Kentucky, males accounted for a greater proportion (52.6%) of self-reported diabetes cases than females (47.4%) for 2000-2003. Since the mid-1990s, the prevalence of diagnosed diabetes increased for both men and women in Kentucky and the US (Figure 4). Although the prevalence among males and females was quite variable during 1995-1999, it has been higher among Kentucky males since 2000, with a high of 9.9% among men compared to 7.3% among women in 2003. During 2000-2003, the US prevalence for males and females was nearly the same and closely followed that of Kentucky females.



Source: Kentucky Behavioral Risk Factor Surveillance System

National data show certain racial/ethnic populations are at higher risk for developing diabetes. In particular, the Black population is at higher risk of developing diabetes than Whites.⁵ Of those respondents who reported being diagnosed with diabetes, 91% were White and 9% were Black (respondents of other races were too few to be analyzed separately and thus were excluded). When the prevalence of diabetes between the two racial groups is compared the contrast is striking. The prevalence of self-reported diabetes in the White population was 7.0% compared with 10.6% among the Black population. The distribution between males and females among the two racial groups was slightly different (Figure 5). Among Whites, males (52.7%) accounted for a slightly larger proportion of the cases than females (47.3%); whereas, among Blacks the proportion was more equal between males (50.8%) and females (49.2%).

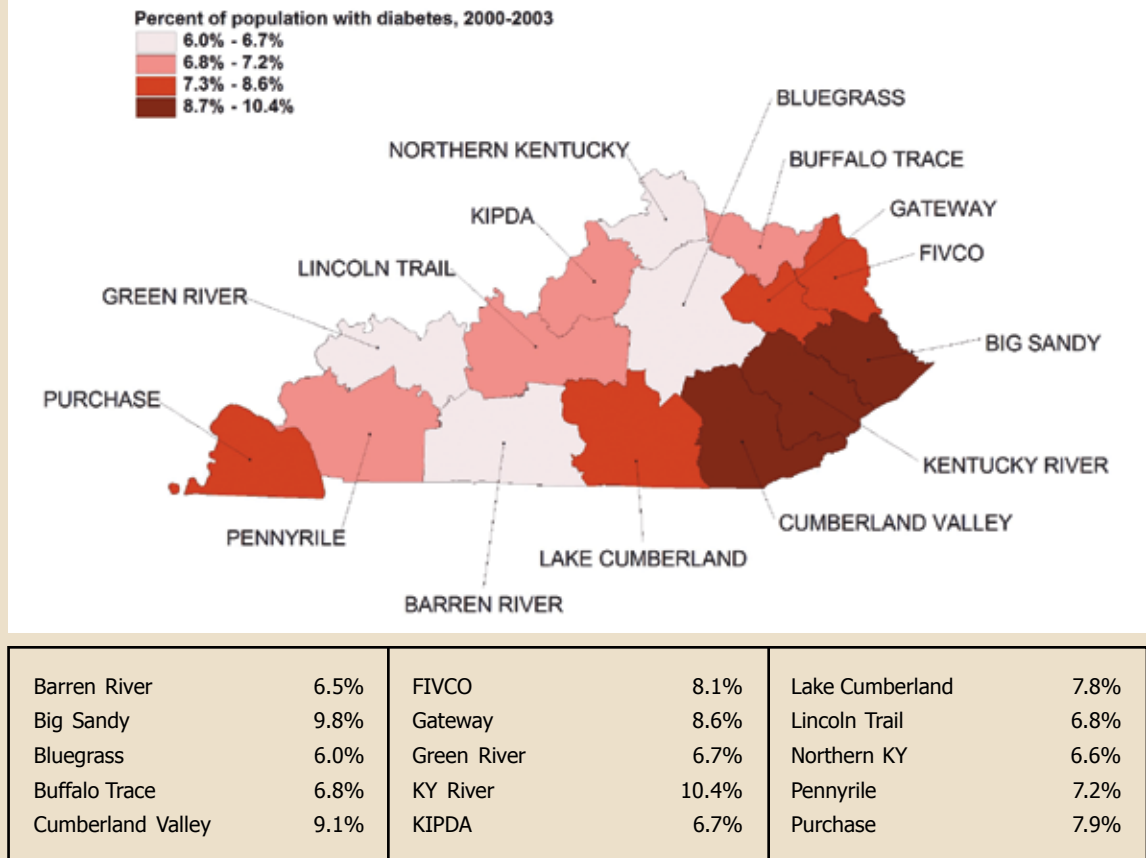
**Figure 5. Proportion of Males and Females with Diagnosed Diabetes, by Race
Kentucky 2000-2003**



Source: Kentucky Behavioral Risk Factor Surveillance System

The prevalence of diabetes varies by geographic region in Kentucky, with the Appalachian region being especially vulnerable. About 34% of adults who reported they have diabetes reside in the Appalachian region of the state; however, the 51 Appalachian counties comprise only about 28% of Kentucky's population. The map in Figure 6 shows the prevalence of people with self-reported diabetes (divided into quartiles) for the 15 Area Development Districts (ADD) which are administrative districts identified for various planning purposes across the state, including the planning of diabetes-related programs. The districts with the highest prevalence of diagnosed diabetes were in the eastern region, or Appalachian region, of Kentucky. The percent of the adult population that reported they have diabetes was highest in Cumberland Valley (9.1%), Big Sandy (9.8%) and Kentucky River (10.4%).

**Figure 6. Diabetes Prevalence in Adults by Area Development District
Kentucky 2000-2003**



Source: Kentucky Behavioral Risk Factor Surveillance System

Note: Respondents with unknown counties are excluded.

Risk Factors for Diabetes

Many Kentuckians are at increased risk for developing type 2 diabetes based on their lifestyles and other modifiable risks. Risk factors that contribute to developing diabetes include overweight, physical inactivity, hypertension (high blood pressure), and high cholesterol. However, people at risk may be able to delay and/or prevent the onset of type 2 diabetes through lifestyle modification. In people at risk for type 2 diabetes, research shows that adopting lifestyle behaviors of moderate physical activity (30 minutes a day for five days a week) and a healthy diet can prevent or delay the onset of the disease.⁶ Effects of these lifestyle behaviors are positive regardless of age, sex, race, or ethnicity. Risk factors such as high blood pressure,

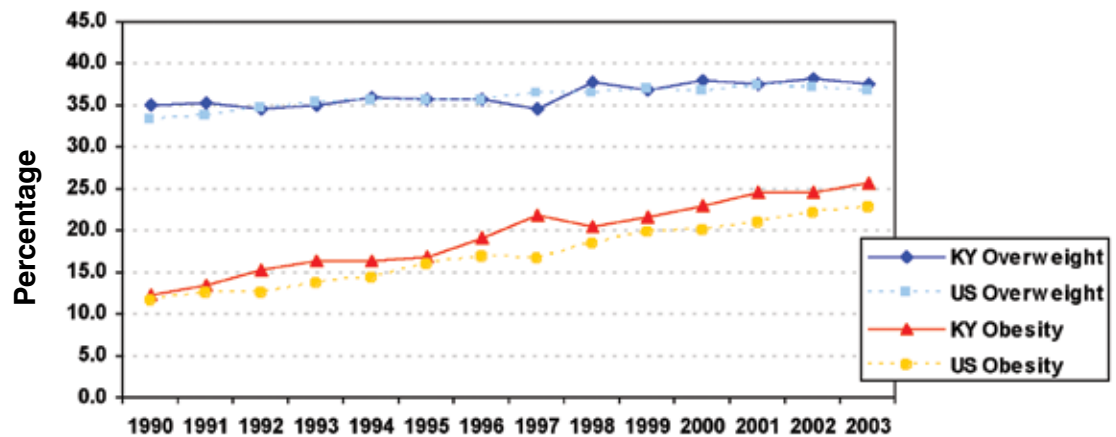
high cholesterol, smoking, excessive body weight, and physical inactivity increase the possibility of complications, especially cardiovascular disease and stroke, among the diabetic population.

Overweight/Obesity. Overweight is defined as excess bodyweight in relation to height, when compared to a standard of desirable weight. Obesity is defined as an excessively high amount of body fat in relation to lean body mass. In obesity, the concern is not only for the amount of fat, but its distribution throughout the body. Body Mass Index (BMI) is a commonly accepted tool for indicating weight status; it measures the amount of weight relative to a person's height. The BRFSS uses the BMI standard for weight classifications: overweight is defined as BMI of 25.0-29.9 and obesity is defined as BMI equal to or greater than 30.0. As BMI increases, the risk for developing some diseases/conditions increases, such as diabetes, cardiovascular disease and high blood pressure.⁷

In Kentucky, the percent of individuals who are overweight has been fairly steady since 1990, ranging from a low of 34.6% to a high of 38.1% (Figure 7). More significantly, the percent of the adult population in Kentucky that is obese increased from a low of 12.2% in 1990 to a high of 25.6% in 2003, an increase of more than 100% (Figure 7). When these two categories were combined, about 63% of Kentuckians were either overweight or obese (BMI ≥ 25.0) in 2003. In other words, in 2003 about one out of every four adults was obese, and nearly two out of every three adults were either overweight or obese. This means about 37% of adult Kentuckians were within a normal weight range which is far from meeting the Healthy Kentuckians 2010 goal of having at least 50% of the adult population at a healthy weight (BMI 19.0-24.9).²

When compared with the US, Kentucky is quite similar in the percentage of overweight adults; however, although the percent of obese adults in the US has continued to increase, the percent in Kentucky has been higher than the US every year since 1990 (Figure 7). In 2003, Kentucky ranked tenth in the nation for prevalence of overweight and fifth for prevalence of obesity.⁴

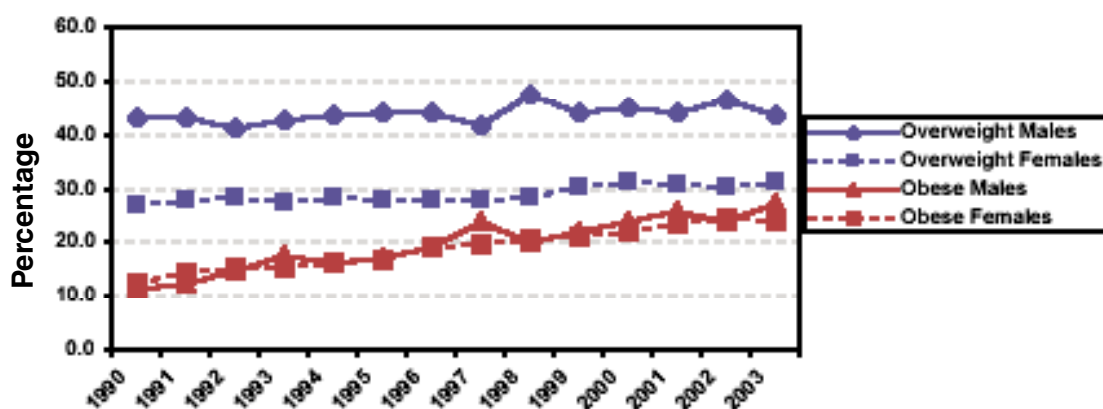
**Figure 7. Prevalence of Overweight and Obese Adults
United States and Kentucky 1990-2003**



Source: Centers for Disease Control and Prevention,
Behavioral Risk Factor Surveillance System⁴

More adult men in Kentucky were categorized as overweight compared to women, and the proportion of overweight men or women fluctuated within only a few percent since 1990 (Figure 8). Conversely, the prevalence of obesity was similar for men and women with percentages for both steadily rising. The prevalence of overweight males and females in Kentucky was similar to the national average each year. However, the prevalence of obesity in Kentucky was higher than the national average each year for both males and females. In 2003, the prevalence of obese males was 27.4% in Kentucky compared to 23.0% for the nation, and the prevalence of obese females was 23.9% in Kentucky compared to 22.0% for the nation.

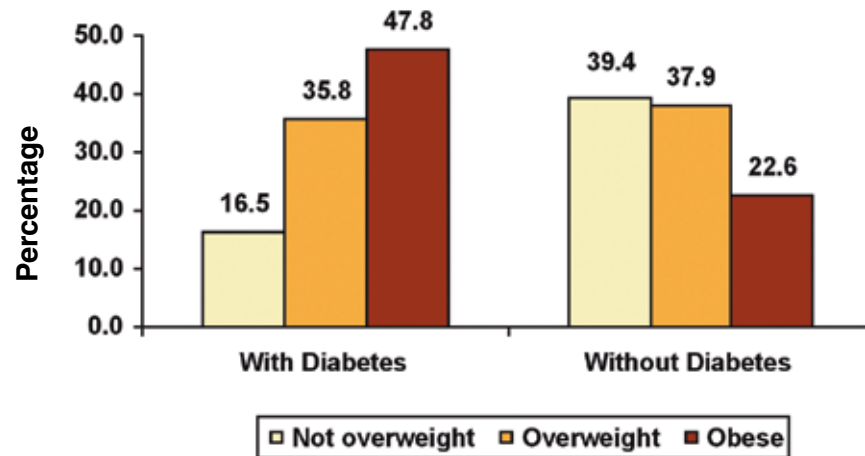
**Figure 8. Prevalence of Overweight and Obese Adults by Gender
Kentucky 1990-2003**



Source: Centers for Disease Control and Prevention,
Behavioral Risk Factor Surveillance System⁴

Among Kentuckians with diabetes, the prevalence of overweight and obesity was even higher than in the general population. Over one-third of people with diabetes were categorized as overweight and nearly half were obese (Figure 9). When these two categories were combined, about 84% of adults with diabetes were overweight or obese (BMI ≥ 25.0) which puts them at high risk for many complications of their disease. In the population without diabetes, about 61% were overweight or obese (BMI ≥ 25.0) which, although it is less, still puts a large number of Kentuckians at risk for diabetes and other health problems.

**Figure 9. Distribution of Overweight and Obesity among Adults with and without Diabetes
Kentucky 2000-2003**



Source: Kentucky Behavioral Risk Factor Surveillance System

Physical Activity. Individuals can help delay or prevent the development of type 2 diabetes by maintaining normal body weight and engaging in regular physical activity. Regular physical activity can reduce the risk of developing diabetes, heart disease, stroke, and high blood pressure; improve cardiovascular health; reduce feelings of depression and anxiety; help to build and maintain healthy bones, muscles and joints; control body weight; and enhance overall quality of life.⁸ During 2000-2003, a higher percentage of Kentuckians with diabetes reported engaging in no leisure physical activity (in the past month) compared to those without diabetes (Table 1). Compared with other states in 2003, Kentucky had the highest percentage of the population reporting sedentary lifestyle (30.6%); the nationwide average was 23.1%.⁴ Also in 2003, 66.2% of Kentucky adults did not meet the recommended guidelines for engaging in moderate physical activity, the highest percentage of any state, compared with 52.8% nationwide.⁴

High Blood Pressure. High blood pressure (hypertension) is a risk factor for diabetes as well as heart disease and stroke. People with diabetes are about twice as likely to develop hypertension as people without diabetes,⁹ putting the diabetic population at greater risk for cardiovascular disease. High blood pressure also increases risks for other complications of diabetes such as damage to the eyes, kidneys, and blood vessels. Hypertension is defined as a blood pressure higher than 140/90. It is recommended that adults with diabetes keep their blood pressure below 130/80 to prevent diabetes-related complications.⁹ Among Kentucky adults, 67% of people with diabetes reported being told they have high blood pressure compared to 27% of Kentuckians without diabetes (Table 1).

Individuals with diabetes are strongly encouraged to have their blood pressure checked regularly, stop smoking, manage body weight, exercise regularly, and take any prescribed medication as directed by a health professional to bring and keep their blood pressure under control.

**Table 1. Risk Factors among Adults with and without Diabetes
Kentucky 2000-2003**

Risk Factors	2000		2001		2002		2003	
	With Diabetes	Without Diabetes	With Diabetes	Without Diabetes	With Diabetes	Without Diabetes	With Diabetes	Without Diabetes
Overweight or Obese	84%	60%	83%	61%	83%	61%	84%	61%
No Leisure Physical Activity in Past Month	54%	40%	49%	32%	35%	26%	42%	30%
High Blood Pressure*	--	--	67%	27%	--	--	67%	27%
High Cholesterol*	--	--	46%	30%	--	--	54%	33%
Smoker	17%	31%	21%	31%	27%	33%	23%	31%

Source: Kentucky Behavioral Risk Factor Surveillance System

*Question not included in 2000 and 2002 surveys

High cholesterol. High cholesterol is a risk factor for diabetes as well as for cardiovascular disease (CVD) which is a major complication associated with diabetes. High cholesterol can often be controlled with modifications to diet and level of physical activity, or through cholesterol lowering medications. Compared to Kentuckians without diabetes, individuals with diabetes have a larger percentage of high cholesterol, and this increased from 46% in 2001 to 54% in 2003 (Table 1).

Smoking. The use of tobacco and tobacco products contributes to thousands of deaths annually in the US and Kentucky. People who have diabetes and smoke increase their risk for complications associated with the disease, especially heart problems. Diabetes alone increases the risk for CVD, but this risk doubles among those who smoke.¹⁰ The percentage of Kentuckians with diabetes who reported they smoked increased from 17% in 2000 to 27% in 2002 and then declined slightly to 23% in 2003 (Table 1). Among the population without diabetes, the percentage of smokers varied from 31% to 33% during 2000-2003 (Table 1). Even though the percentage of smokers was lower for people with diabetes than the general population, it still means about 1 in 5 people with diabetes are smokers and smoking cessation should be a high priority.

Preventive Care Practices among Individuals with Diabetes

Diabetes is largely a self-managed disease and individuals with the disease must be knowledgeable regarding their day-to-day care. Proper management of diabetes, including self-monitoring of blood glucose, an appropriate diet and exercise plan, and regular physician checkups, can prevent or delay the onset or progression of serious complications associated with the disease.¹¹ Furthermore, any sustained lowering of blood sugar helps, even for a person who has a poor history of blood sugar control.¹¹ The goal of diabetes management is to keep blood glucose levels as close to a normal range as possible, avoiding blood glucose levels that are too high or too low. Routine self-monitoring of blood glucose is an important component in self-management of diabetes since it helps to guide decisions regarding dietary intake, exercise and medication. The A1C measure, a test that indicates the average blood glucose level over the previous three months, is also an essential monitoring tool in the management of diabetes. It is recommended that individuals with diabetes receive an A1C test at least two times per year.¹²

Because the risk of complications from diabetes increases with higher A1C levels, monitoring the A1C level on a regular basis is a critical component of diabetes care.

According to the American Diabetes Association,¹³ methods or ways to control diabetes and help prevent short-term and long-term complications include the following:

- diabetes self-management education (at diagnosis and ongoing)
- routine health care visits (every 3-6 months)
- taking diabetes-related medications as prescribed
- a healthy meal plan (daily)
- exercise (daily)
- A1C testing (2-4 times per year)
- height and weight check (at each physician visit)
- blood pressure measurement (at each physician visit)
- blood cholesterol/lipid profile measurement (at least annually)
- kidney function tests/microalbuminuria (annually)
- foot examination by physician (annually or when problems occur)
- self foot inspection (daily)
- dilated eye exam (annually)
- flu vaccination (annually)
- pneumonia vaccination (once or twice in lifetime)
- dental examination (every six months)
- pre-pregnancy and family planning counseling for women of reproductive age
- smoking cessation.

Table 2 displays the preventive care practice behaviors reported by individuals with diabetes during each year for 2000-2003 in Kentucky and shows the US comparison for 2003. In nearly every category Kentucky compared favorably with the US for 2003. Categories that showed some improvement over the four-year period include checking blood glucose, checking feet, obtaining a pneumonia vaccine, and having an A1C check. There was a drop in respondents who had a dilated eye exam in 2003, but the percentage was still close to the national average.

People with diabetes are approximately three times more likely to die of complications of flu or pneumonia than people without diabetes.¹⁴ To avoid these risks, it is vitally important for people with diabetes to receive a vaccine for pneumonia and to receive a flu shot each year. Less than half (48%) of adult Kentuckians with diabetes reported ever receiving a pneumonia vaccine and only 57% reported receiving a flu shot in 2003 (Table 2).

Healthy Kentuckians 2010 has set several goals related to preventive care practices among people with diabetes.² These goals can be used to assess the percentages for preventive care practices in Tables 2-4 and look for areas of accomplishment or needed improvement. The goals of Health Kentuckians 2010 are as follows:

- **Increase to 75% the proportion of persons with diabetes who have an annual dilated eye exam (objective 18.15).** Kentucky met this goal in 2000 and 2002, but fell slightly short in 2001 and 2003 (Table 2).
- **Increase to 70% the proportion of persons with diabetes who have at least an annual foot exam (objective 18.16).** Kentucky is close to meeting its goal with 64% in 2003 (Table 2).
- **Increase to 45% the proportion of persons with diabetes who perform blood glucose monitoring at least daily (objective 18.18).** Kentucky surpassed this goal for 2000-2003 (Table 2).
- **Increase the proportion of persons with diabetes who have received formal diabetes self-management training (objective 18.19).** (Note: Kentucky began collecting this information on the BRFSS in 2000 and a target will be set by mid-decade.) Although a target has not been set yet, the percentage participating in a diabetes management course/class in Kentucky has been fairly steady during 2000-2003, ranging from 43% to 47%, but is slightly lower than the national average of 51% in 2003 (Table 2).
- **Increase to 80% the proportion of persons with diabetes who receive an annual flu vaccination (objective 18.20).** Kentucky needs to continue to work toward meeting this goal. Only 57% reported receiving a flu vaccine in 2003; however, this is the same as the national average (Table 2).

Table 3 compares the state as a whole with selected population groups: the Appalachian region and the non-Appalachian region; Blacks and Whites; and, age under 65 and age 65 and older. Two-year averages are shown in Table 3 in order to obtain enough respondents in some of the

categories; however, the sample sizes for Blacks and age 65+ were still very small compared to the other groups so their percentages should be interpreted with some caution.

When compared with the non-Appalachia area of the state, residents of Appalachia had a lower percentage of respondents that had taken a course on managing diabetes, had an A1C check in the last year, and received flu and pneumonia vaccines (Table 3). Appalachia and non-Appalachia were similar in 2000-2001 for receiving a dilated eye exam in the past year, but in Appalachia this dropped to 59% in 2001-2003 compared to 76% in non-Appalachia.

When comparing Blacks and Whites on reported preventive care behaviors, a higher percentage of Blacks than Whites reported participating in a course on managing diabetes, and receiving a dilated eye exam and a foot exam in the past year (Table 3). The percentage of Blacks who reported ever receiving a pneumonia vaccine improved from 29% in 2000-2001 to 47% in 2002-2003.

Reported preventive care behavior varied somewhat between the age groups of <65 and 65+ (Table 3). The younger age group had a higher percentage who reported they participated in a course on diabetes management, checked their feet at least once a month, checked their blood glucose at least once per day, and had an A1C check in the past year, while the older age group had a higher percentage of dilated eye exams and flu and pneumonia vaccinations. Only 2-3% of the older population reported having a foot sore that lasted more than four weeks, compared with 13-14% in the younger age group; however, this should be interpreted with some caution because of the small sample size for the older age group.

The percentage of Kentuckians who reported having an A1C check in the past year improved from 65% in 2000-2001 to 74% in 2002-2003, but was lowest among respondents age 65 and older (Table 3). To this same question, respondents might respond that they don't know if they had the test or they never heard of the test. The percentage of respondents who chose "Don't Know" or "Never Heard of A1C" improved statewide. For 2000-2001, 24% of respondents either did not know if they had an A1C test or had not heard of the test, compared with 18%

in 2002-2003 (Table 3); however, this percentage varied among population groups and was particularly high among the age group of 65 and older with 41% for 2002-2003 (Table 3).

Table 4 shows the reported preventive care practices by Area Development District for 2000-2003 combined, with the statewide percentage provided for comparison. Big Sandy ADD was particularly low compared with the other ADDs for the percentage of residents with diabetes who received flu and pneumonia shots. Big Sandy also had the lowest percentage receiving dilated eye exams in the past year and the highest percentage of respondents who reported they had been told by a doctor that diabetes had affected their eyes.

Table 2. Reported Preventive Care Practices Among Adults with Diabetes, by Year

Preventive Care Practice	Kentucky				US
	2000	2001	2002	2003	2003
Saw a health professional for diabetes ≥ 1 time in the past year	94%	95%	94%	94%	90%
Ever taken a course or a class in how to manage diabetes	46%	47%	46%	43%	51%
Checked blood glucose ≥ 1 time per day	55%	58%	64%	64%	57%
Received a dilated eye exam in the past year	76%	71%	75%	66%	68%
Ever told by a doctor that diabetes has affected your eyes or that you had retinopathy	24%	28%	26%	28%	22%
Received a foot exam ≥ 1 time in the past year	63%	64%	62%	64%	69%
Checked feet for sores at least once per month	84%	88%	92%	93%	87%
Had a foot sore that lasted more than 4 weeks*	13%	13%	13%	14%	13%
Received a flu vaccination in the last year*	--	52%	52%	57%	56%
Ever received a pneumonia vaccine*	--	40%	39%	48%	48%
Had A1C checked ≥ 1 time in the past year	62%	67%	72%	75%	76%
"Don't Know" or "Never Heard of A1C"	25%	23%	21%	15%	14%

Source: Kentucky Behavioral Risk Factor Surveillance System

*Question not included in 2000 survey

**Table 3. Reported Preventive Care Practices Among Adults with Diabetes, by Select Populations
Kentucky 2000-2003**

Preventive Care Practice	Statewide			Appalachia			Non-Appalachia			White			Black			Age <65			Age 65+		
	2000	2001	2002	2000	2001	2002	2000	2001	2002	2000	2001	2002	2000	2001	2002	2000	2001	2002	2000	2001	2002
Saw a health professional for diabetes ≥ 1 time in the past year	95%		94%	94%		94%	95%		94%	94%		94%	100%		98%	94%		93%	93%		91%
Ever taken a course or a class in how to manage diabetes	46%		44%	36%		38%	51%		48%	44%		44%	50%		53%	50%		47%	33%		25%
Checked blood glucose ≥ 1 time per day	56%		64%	58%		61%	56%		65%	55%		64%	65%		64%	57%		65%	45%		48%
Received a dilated eye exam in the past year	73%		70%	72%		59%	74%		76%	72%		69%	83%		88%	70%		66%	77%		77%
Ever told by a doctor that diabetes has affected your eyes or that you had retinopathy	26%		27%	32%		29%	23%		26%	26%		26%	30%		27%	27%		28%	34%		25%
Received a foot exam ≥ 1 time in the past year	63%		63%	61%		61%	65%		64%	63%		62%	71%		79%	62%		62%	57%		56%
Checked feet for sores at least once per month	86%		93%	83%		93%	87%		93%	86%		93%	89%		95%	85%		94%	72%		71%
Had a foot sore that lasted more than 4 weeks*	13%		14%	14%		16%	13%		12%	13%		14%	14%		11%	13%		14%	2%		3%
Received a flu vaccination in the last year*	52%		55%	45%		48%	55%		59%	52%		56%	54%		56%	41%		44%	73%		79%
Ever received a pneumonia vaccine*	40%		44%	35%		37%	43%		47%	42%		44%	29%		47%	27%		31%	79%		65%
Had A1C checked ≥ 1 time in the past year	65%		74%	59%		68%	68%		76%	66%		74%	61%		72%	70%		77%	55%		49%
"Don't Know" or "Never Heard of A1C"	24%		18%	29%		22%	21%		16%	23%		18%	27%		21%	18%		13%	29%		41%

Source: Kentucky Behavioral Risk Factor Surveillance System

*Question not included in 2000 survey

Table 4. Reported Preventive Care Practices Among Adults with Diabetes, by ADD

Kentucky 2000-2003

Preventive Care Practice	Barren River	Big Sandy	Bluegrass	Buffalo Trace	Cumberland Valley	FIVCO	Gateway	Green River	KY River	KIPDA	Lake Cumberland	Lincoln Trail	Northern KY	Pennyrile	Purchase	STATEWIDE
Saw a health professional for diabetes ≥ 1 time in the past year	95%	93%	97%	92%	97%	96%	92%	89%	96%	94%	95%	95%	94%	94%	91%	94%
Ever taken a course or a class in how to manage diabetes	41%	35%	47%	41%	39%	45%	41%	43%	27%	52%	38%	43%	58%	43%	49%	45%
Checked blood glucose ≥ 1 time per day	67%	61%	63%	57%	57%	64%	62%	54%	57%	66%	51%	60%	54%	54%	68%	60%
Received a dilated eye exam in the past year	73%	56%	79%	56%	72%	71%	71%	72%	57%	75%	66%	72%	71%	74%	70%	71%
Ever told by a doctor that diabetes has affected your eyes or that you had retinopathy	30%	35%	29%	30%	32%	28%	26%	24%	31%	21%	21%	23%	28%	22%	32%	27%
Received a foot exam ≥ 1 time in the past year	62%	65%	66%	62%	65%	57%	61%	60%	64%	63%	61%	65%	65%	62%	61%	63%
Checked feet for sores at least once per month	93%	93%	89%	93%	96%	88%	84%	89%	93%	87%	87%	92%	87%	88%	92%	90%
Had a foot sore that lasted more than 4 weeks*	14%	17%	14%	17%	17%	12%	15%	17%	14%	12%	14%	14%	12%	7%	9%	13%
Received a flu vaccination in the last year*	46%	39%	59%	47%	51%	53%	54%	56%	44%	54%	58%	61%	64%	52%	50%	54%
Ever received a pneumonia vaccine*	42%	26%	49%	38%	42%	45%	37%	52%	40%	44%	34%	36%	47%	39%	46%	43%
Had A1C checked ≥ 1 time in the past year	62%	71%	65%	73%	66%	67%	64%	75%	60%	76%	65%	73%	79%	62%	69%	70%
"Don't Know" or "Never Heard of A1C"	26%	18%	25%	16%	25%	23%	22%	14%	32%	19%	22%	20%	8%	24%	19%	21%

Source: Kentucky Behavioral Risk Factor Surveillance System

*Question not included in 2000 survey and reflects a three-year average

Note: Respondents from unknown counties were excluded.

A map of Kentucky with ADDs is included at the end of this document

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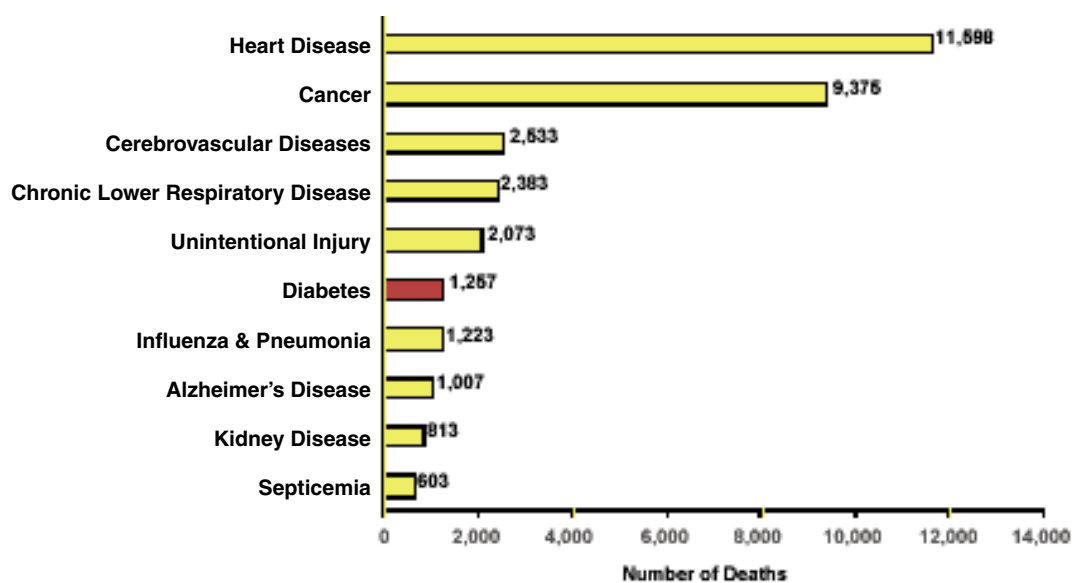
Diabetes Mortality

Mortality data were obtained from the Surveillance and Health Data Branch within the Kentucky Department for Public Health. Death certificate data are used to classify the underlying cause of death, such as diabetes, heart disease and cancer. Although death certificates provide the best available data for monitoring trends in mortality, studies have found diabetes to be under-reported as a cause of death.¹ For example, related complications such as heart disease or stroke may be listed as the underlying cause of death rather than diabetes. Thus, it is important to keep in mind that the figures reported here likely under-represent the impact diabetes has on mortality in Kentucky.

It is important to note that in 2002 special diabetes-related items were added to the Kentucky death certificate, which may have increased the frequency of diabetes being reported as the underlying cause of death. Thus, caution should be used when interpreting these data and in comparing 2002 data to previous years.

In 2002, diabetes was the sixth leading cause of death, and the fifth leading cause of death from disease, in the United States as well as Kentucky. There was a total of 40,378 deaths in Kentucky during 2002, of which 1,257 were due to diabetes (Figure 1). The age-adjusted rate for mortality due to diabetes decreased slightly from 1999 to 2001 but increased in 2002 (Table 1). The Kentucky rate for 2002 (31.0 per 100,000) was slightly higher than the national rate for the same year (25.4) (Table 1). Kentucky's rate for 2002 was above the Healthy Kentuckians 2010 goal (objective 18.4) of no more than 28 deaths per 100,000 persons.²

Figure 1. Leading Causes of Mortality in Kentucky 2002



Source: Kentucky Department for Public Health, Surveillance and Health Data Branch

Table 1. Diabetes Mortality Rates, Kentucky and United States

Diabetes Mortality	Kentucky				US ³ 2002
	1999	2000	2001	2002	
Age-Adjusted rate per 100,000	28.7	26.5	25.9	31.0	25.4
Number of Deaths	1,118	1,054	1,048	1,257	--

Source: Kentucky Department for Public Health, Surveillance and Health Data Branch

Table 2 compares the mortality rates among males and females, and races of Black and White. Although there were more deaths among females, the age-adjusted death rate was higher among males (34.5) than females (28.0). The difference in diabetes mortality rates between Blacks and Whites is striking. Among the Black population there were 143 deaths compared with 1,111 deaths among the White population; however, the age-adjusted rate for Blacks (64.9) was 2.2 times higher than for Whites (29.4).

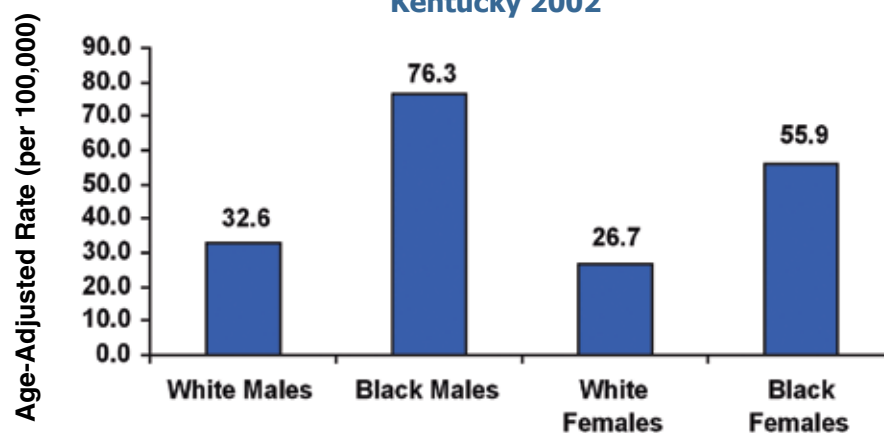
Table 2. Diabetes Mortality by Gender and Race, Kentucky 2002

Diabetes Mortality	Male	Female	Black	White
Age-Adjusted rate per 100,000	34.5	28.0	64.9	29.4
Number of Deaths	577	680	143	1,111

Source: Kentucky Department for Public Health, Surveillance and Health Data Branch

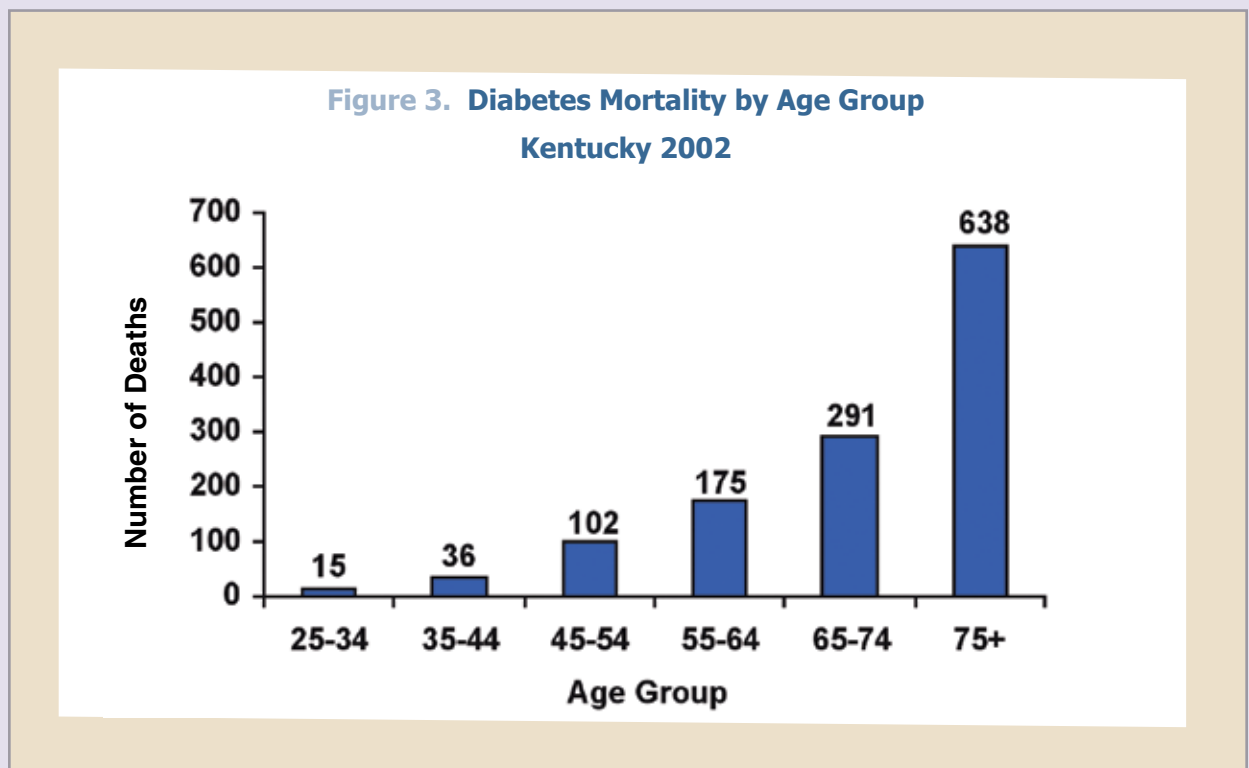
Notable differences can be seen in the mortality rates for males and females grouped by race (Figure 2). The diabetes mortality rate for Black males was 2.3 times that of White males, while the death rate for Black females was about twice that of White females.

Figure 2. Age-Adjusted Diabetes Mortality Rates by Gender and Race Kentucky 2002



Source: Kentucky Department for Public Health, Surveillance and Health Data Branch

As shown in Figure 3, the number of deaths due to diabetes increases substantially with age. For 2002, half (51%) of the deaths due to diabetes occurred in Kentuckians aged 75 and older. As would be expected, the mortality rates also increased with age. For example, the age-specific mortality rate for 55-64 year-olds was 43.5 (per 100,000), and increased to 106.3 in the 65-74 age group and 271.9 in the 75+ age group.



Source: Kentucky Department for Public Health, Surveillance and Health Data Branch

Table 3 shows the number of deaths due to diabetes and the age-adjusted rates for each Area Development District (ADD) to allow for comparisons across different areas of the state over the four-year period of 1999-2002. The three highest rates for each year are designated in bold type. Rates in Northern KY and Big Sandy ADDs were consistently among the highest in the state.

**Table 3. Diabetes Mortality by Area Development District
Kentucky 1999-2002**

ADD	1999		2000		2001		2002	
	Number of Deaths	Age-Adjusted Rate	Number of Deaths	Age-Adjusted Rate	Number of Deaths	Age-Adjusted Rate	Number of Deaths	Age-Adjusted Rate
Barren River	55	21.7	62	24.0	69	26.6	79	29.9
Big Sandy	59	41.5	49	32.5	54	34.6	65	43.2
Bluegrass	170	28.5	149	24.3	133	21.3	173	27.6
Buffalo Trace	29	47.6	17	28.8	14	23.1	19	32.1
Cumberland Valley	72	32.4	58	24.6	64	26.7	88	37.5
FIVCO	45	31.2	46	31.2	45	30.1	56	36.7
Gateway	20	28.5	15	20.8	22	29.1	17	23.1
Green River	73	33.8	89	40.4	58	25.8	86	38.0
Kentucky River	32	28.6	41	35.8	35	28.2	21	17.2
KIPDA	218	25.5	208	24.1	211	24.2	251	28.6
Lake Cumberland	63	29.5	48	21.9	46	20.5	61	27.4
Lincoln Trail	52	24.4	52	24.7	58	26.8	57	27.0
Northern KY	133	39.9	117	35.0	122	35.8	133	38.6
Pennyrile	54	23.4	47	20.8	64	28.0	83	35.9
Purchase	43	18.4	56	22.7	53	22.2	68	28.7
STATE TOTAL	1,118	28.7	1,054	26.5	1,048	25.9	1,257	31.0

Source: Kentucky Department for Public Health, Surveillance and Health Data Branch
Age-adjusted rates are per 100,000.

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Hospitalizations Due to Diabetes

Uncontrolled diabetes can cause large and small blood vessel damage which can lead to heart disease, stroke, kidney failure, blindness and amputations. Appropriate health care for patients with diabetes and effective diabetes self-management can reduce the risks of developing serious complications and improve the quality of life for individuals living with diabetes. A goal of the Kentucky Diabetes Prevention and Control Program is to reduce these complications and hospitalizations associated with them. Data are available to monitor hospitalizations due to diabetes and related complications such as diabetic ketoacidosis, lower extremity amputations, ischemic heart disease and cerebrovascular disease (stroke).

Mandated by state law, hospitals in Kentucky are required to report selected data elements so that the State can assess health care utilization in the Commonwealth. The Health Policy Development Branch within the Kentucky Department for Public Health, Cabinet for Health and Family Services is responsible for compiling the billing data from all inpatient hospitalizations in the state. The data are unique in that all inpatient stays are included regardless of payer status. We can use these data to learn more about hospitalizations due to diabetes and its related complications, thereby increasing our understanding of the impact of this disease on the health of Kentuckians.

Hospitalization data were obtained for the three-year period of January 2000 - December 2002 (the most recent data available). The International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) is the system used to assign diagnostic and procedure codes to hospital utilization. ICD-9-CM diagnosis codes specific for diabetes and related complications include 250.0-250.9 (as used in Table 3). Hospitalizations are coded with one primary diagnosis and up to nine secondary diagnoses. Codes for diabetes (250.0-250.9) can be used for either a primary or a secondary diagnosis. For example, a patient may be hospitalized primarily due to diabetes with a secondary diagnosis related to a heart problem, or a patient may be hospitalized primarily for heart disease but also have a secondary complication related to diabetes.

During 2000-2002, the Kentucky Inpatient Hospitalization Claims data had a total of 1,647,363 hospitalizations, of which 21,565 (1.3%) had diabetes as a primary diagnosis and 245,150 as a secondary diagnosis, for a total of 266,715 (16.2%) hospitalizations related to diabetes (a primary or a secondary diagnosis) (Table 1). **It is important to note that these figures represent the number of hospitalizations, not the number of people who were hospitalized because a person could have multiple hospitalizations.** Although the number of hospitalizations related to diabetes increased from 79,307 in 2000 to 96,320 in 2002, diabetes-related hospitalizations as a proportion of the total number of hospitalizations changed by only 5% over the three-year period (Table 1).

**Table 1. Hospitalizations
Kentucky 2000-2002**

Year	Total Hospitalizations	Hospitalizations Directly Due to Diabetes (Primary Diagnosis)	Diabetes-related Hospitalizations (Primary or Secondary Diagnosis)
2000	503,988	6,510 (1.3%)	79,307 (15.7%)
2001	561,344	7,403 (1.3%)	91,088 (16.2%)
2002	582,031	7,652 (1.3%)	96,320 (16.5%)
3-Year Total	1,647,363	21,565 (1.3%)	266,715 (16.2%)

Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

Table 2 shows the number of diabetes-related hospitalizations by Area Development District (ADD) for each year. For comparison across years and among the ADDs, the table includes the diabetes-related hospitalizations as a percentage of the total hospitalizations in the ADD for each year. Big Sandy and Kentucky River ADDs had the highest percentages of hospitalizations that were diabetes-related (more than 19% each year), while Lincoln Trail had the lowest percentages (less than 15% each year), followed closely by Bluegrass and KIPDA.

Table 2.
Diabetes-Related Hospitalizations (Primary or Secondary Diagnosis) by ADD
Kentucky 2000-2002

ADD	Number (percent of total hospitalizations in ADD)		
	2000	2001	2002
Barren River	4,848 (15.4%)	5,528 (15.9%)	5,980 (15.8%)
Big Sandy	5,421 (19.2%)	5,484 (19.3%)	5,798 (19.8%)
Bluegrass	9,521 (13.9%)	11,037 (14.7%)	11,947 (15.1%)
Buffalo Trace	1,165 (15.0%)	1,238 (17.1%)	1,343 (16.9%)
Cumberland Valley	7,451 (17.6%)	8,117 (18.2%)	8,204 (18.3%)
FIVCO	4,110 (18.3%)	4,303 (18.2%)	4,461 (18.7%)
Gateway	1,327 (16.7%)	1,602 (17.5%)	1,590 (16.9%)
Green River	4,036 (13.9%)	4,539 (16.2%)	5,156 (16.7%)
Kentucky River	4,556 (19.3%)	5,241 (19.1%)	5,635 (19.6%)
KIPDA	15,663 (15.0%)	17,686 (15.1%)	18,792 (15.4%)
Lake Cumberland	5,069 (15.3%)	5,518 (15.9%)	5,672 (16.8%)
Lincoln Trail	3,505 (13.4%)	4,189 (14.4%)	4,500 (14.8%)
Northern KY	4,286 (16.5%)	7,068 (15.9%)	7,594 (16.5%)
Pennyrile	3,744 (15.1%)	4,511 (16.9%)	4,815 (16.9%)
Purchase	4,605 (16.0%)	5,027 (16.5%)	4,873 (16.2%)
STATE TOTAL	79,307 (15.7%)	91,088 (16.2%)	96,320 (16.5%)

Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

Table 3 shows inpatient hospitalizations in which the primary diagnosis code was for diabetes (250.0-250.9) by each specific code, and by males and females within each code. Females comprised a higher proportion of the 21,565 hospitalizations than males, 53.2% versus 46.8%, respectively. The percentage of hospitalizations due to diabetes from various causes can be compared across gender. For example, of the hospitalizations for diabetes with ketoacidosis (DKA), females (54.5%) accounted for a higher proportion than males (45.5%). For patients with a primary diagnosis of diabetes, the average length of stay was 5.1 days and the average charge claimed was \$11,910 during 2000-2002.

Table 3.

**Hospitalizations Due Directly to Diabetes (Primary Diagnosis), by Diagnosis and Gender
Kentucky 2000-2002**

Primary Diagnosis by ICD-9-CM Code	TOTAL		FEMALES		MALES	
	Number	Percent of total diabetes cases	Number	Percent of diagnosis code	Number	Percent of diagnosis code
Diagnosis with Ketoacidosis (DKA) (250.1)	5,360	24.9	2,922	54.5	2,438	45.5
Diabetes with Other Specified Manifestations (250.8)	5,000	23.2	2,612	52.2	2,388	47.8
Diabetes Mellitus without mention of complication (250.8)	4,174	19.4	2,324	55.7	1,850	44.3
Diabetes with Neurological Manifestations (250.6)	2,302	10.7	1,342	58.3	960	41.7
Diabetes with Peripheral Circulatory Disorders (250.7)	2,232	10.4	958	42.9	1,274	57.1
Diabetes with Renal Manifestations (250.4)	1,301	6.0	657	50.5	644	49.5
Diabetes with Unspecified Complications (250.9)	495	2.3	265	53.5	230	46.5
Diabetes with Hyperosmolarity (250.2)	404	1.9	214	53.0	190	47.0
Diabetes with Other Coma (250.3)	222	1.0	133	60.0	89	40.0
Diabetes with Ophthalmic Manifestations (250.5)	75	0.3	51	68.0	24	32.0
TOTAL	21,565	100.0	11,478	53.2	10,087	46.8

Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

Table 4 shows the age distribution of diabetes hospitalizations in two different ways. The first row of the table shows the age distribution of those who were hospitalized with a primary diagnosis of diabetes, while the second row includes hospitalizations with either a primary or secondary diagnosis of diabetes. When diabetes is the primary diagnosis, the cases are evenly divided among those under age 45 (34.2%), those aged 45-64 (33.4%) and those aged 65 and older (32.4%). For hospitalizations with a primary or secondary diabetes diagnosis, the older age groups of 65-74 and 75+ accounted for over half (54.5%) of the hospitalizations, while those aged 45-64 accounted for about one-third (34.5%) and those aged 44 and under accounted for 11.0%.

**Table 4. Proportion of Diabetes Hospitalizations by Age Group
Kentucky 2000-2002**

Diabetes Diagnosis	<15	15-24	25-44	45-64	65-74	75+	Total
Primary Diagnosis	3.7%	8.5%	22.0%	33.4%	16.3%	16.1%	100%
Primary or Secondary Diagnosis	0.4%	1.3%	9.3%	34.5%	25.9%	28.6%	100%

Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

Cardiovascular Disease

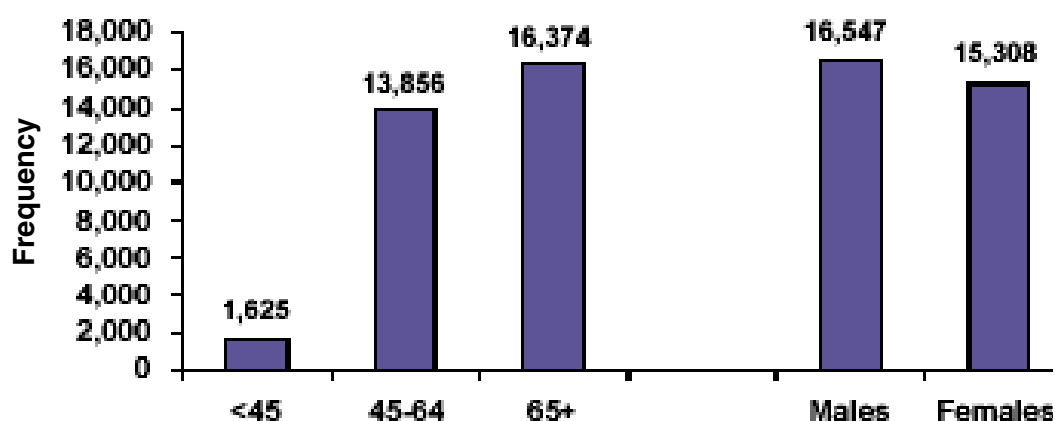
Cardiovascular disease (CVD), which includes a variety of disorders of the heart and circulatory system, is a major complication of diabetes. CVD occurs two to four times more often in persons with diabetes than it does in those without diabetes.¹ Cardiovascular disease is the leading cause of death among people with diabetes in the US; 27% of people with diabetes have CVD, and an additional 71% have CVD risk factors.² At least 65% of people with diabetes die of heart disease or stroke.¹ Furthermore, people with diabetes are more likely to die of a heart attack than people without diabetes.¹ Controlling blood pressure, blood glucose and cholesterol, as well as quitting smoking, can help reduce the risk of CVD in people with diabetes.¹

Ischemic Heart Disease (IHD), also known as coronary artery disease, refers to heart problems caused by narrowed heart arteries which deplete the heart of blood and oxygen. In Kentucky

during 2000-2002, there were 31,855 hospitalizations that had IHD recorded as the primary diagnosis and diabetes as a secondary diagnosis. The number of cases increased from 9,688 in 2000 to 11,150 in 2001 and declined slightly to 11,017 in 2002; however, the proportion of total hospitalizations over the three years remained steady at about 2.0%.

Figure 1 shows the age and sex distribution for hospitalized individuals with a primary diagnosis of IHD and a secondary diagnosis of diabetes. Males (51.9%) accounted for a slightly higher percentage of the cases than females (48.1%). Just over half (51.4%) of the hospitalizations due to IHD with diabetes were persons aged 65 and older, and 43.5% were persons aged 45-64. While only 5.1% of the hospitalizations were in the age group of less than 45 years old, this accounted for over 1,600 relatively young individuals.

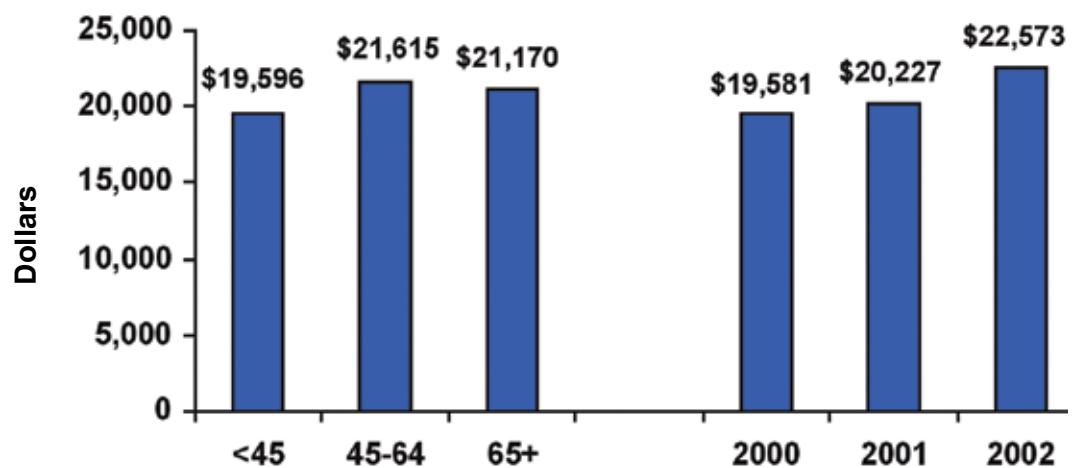
**Figure 1. Hospitalizations Due to IHD with Diabetes as Secondary Diagnosis, by Age Group and Sex
Kentucky 2000-2002**



Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

The average length of stay for hospitalizations due to IHD with diabetes decreased slightly from 4.6 days in 2000 to 4.3 days in 2002. During 2000-2002, the length of stay was 4.5 days for female cases and 4.3 days for males. The length of stay was 3.9 days for patients under 45, 4.0 days for ages 45-64, and 4.8 days for ages 65 and older. The average charge claimed for hospitalizations due to IHD with diabetes was \$20,793 (2000-2002 combined); the average increased over the three-year period from \$19,581 in 2000 to \$22,573 in 2002 (Figure 2). The age group with the highest average charge claimed was 45-64 (Figure 2). Interestingly, although females had a slightly longer average length of stay, the average hospital charge

**Figure 2. Average Charge Claimed for Hospitalizations Due to IHD with Diabetes as Secondary Diagnosis, by Age Group and Year
Kentucky 2000-2002**



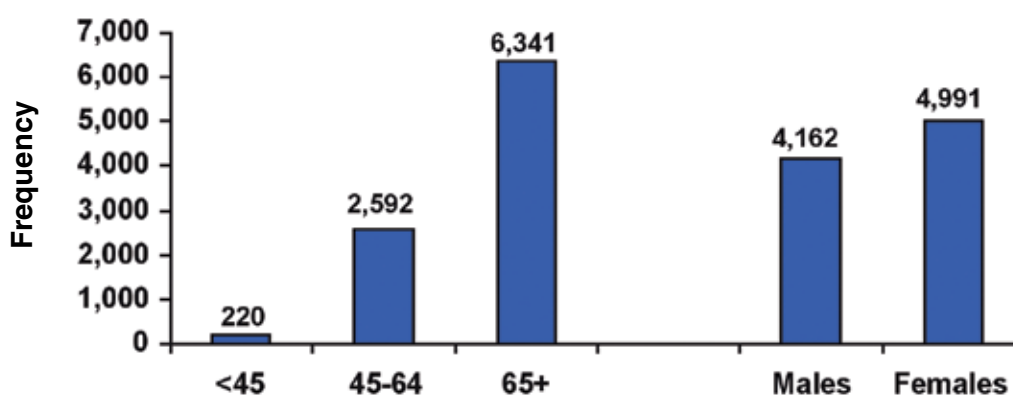
Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

Cerebrovascular Disease

Cerebrovascular disease (CBVD) manifests as cerebral vascular events, more commonly known as strokes. Diabetes increases the risk of stroke, and because many people with diabetes are overweight and have high blood pressure and cholesterol, their risk of stroke further increases. During 2000-2002, the Kentucky Inpatient Hospitalization Claims showed 9,153 hospitalizations for CBVD as the primary diagnosis and diabetes as a secondary diagnosis, with the number of hospitalizations remaining fairly stable over the three-year period. Females (54.5%) accounted

for a higher proportion of the hospitalizations than males (45.5%), as shown in Figure 3. The majority of the hospitalizations for CBVD with diabetes were in the age group of 65 and older with 69.3%, followed by the 45-64 age group with 28.3%, and the age group of 45 and younger with 2.4% (Figure 3).

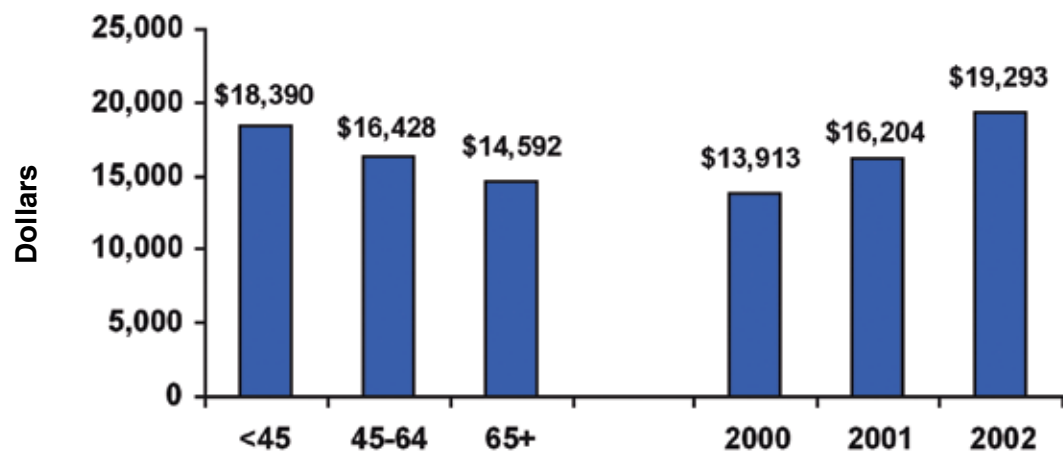
Figure 3. Hospitalizations Due to CBVD with Diabetes as Secondary Diagnosis, by Age Group and Gender Kentucky 2000-2002



Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

The average charge claimed for a hospitalization due to CBVD with diabetes was \$16,470 (2000-2002 combined). The average charge claimed was highest in the younger age group and the average for all ages combined showed an increase of over \$5,000 during the three year period of 2000-2002 (Figure 4). The average length of stay during 2000-2002 was 6.4 days; females were slightly higher with 6.5 days and males slightly lower with 6.2 days. Patients in the youngest age group (under 45) had a longer average length of stay (7.0 days) than the 45-64 age group (6.3 days) and the 65 and older age group (6.4 days).

Figure 4. Average Charge Claimed for Hospitalizations Due to CBVD with Diabetes as Secondary Diagnosis, by Age Group and Year Kentucky 2000-2002



Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

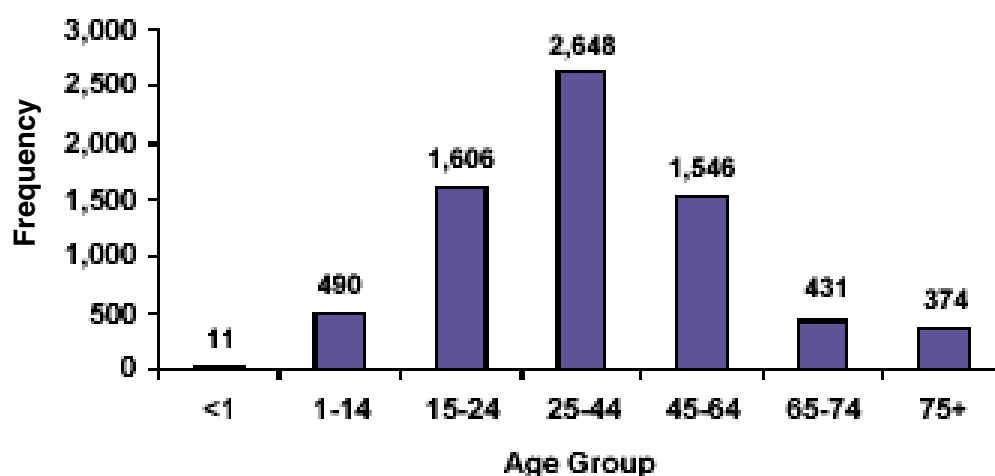
Diabetic Ketoacidosis

Diabetic Ketoacidosis (DKA) is an acute metabolic complication that results from a deficiency of insulin. When there is a lack of insulin, ketones (acids) build up in the blood and can reach dangerously high levels.³ It is a serious condition that may result in coma or death.³ DKA occurs more frequently in individuals with type 1 diabetes, but may occur in those with type 2 diabetes as well. Careful attention to blood glucose control is essential in the prevention of DKA.

As shown in Table 3, DKA accounted for one-quarter (24.9%) of hospitalizations with diabetes as a primary diagnosis. In total, there were 7,106 hospitalizations that recorded DKA as either a primary or secondary diagnosis.

More females (55.1%) than males (44.9%) were admitted with DKA as a primary or secondary diagnosis during 2000-2002. Figure 5 shows the number of admissions due to DKA as either a primary or secondary diagnosis by age group. The age group with the highest percent of hospital stays due to DKA was 25-44 year olds, who represented 37.3% of those admitted. Two-thirds (66.9%) of the DKA admissions were for persons younger than 45 years old.

**Figure 5. Hospitalizations Due to DKA (primary or secondary diagnosis) by Age Group
Kentucky 2000-2002**



Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

DKA can result in hospitalization of several days. The average length of stay for a patient with a primary diagnosis of DKA was steady during 2000-2002, accounting for an average of 3.6 days each year. On average, females had slightly longer hospital stays than males in 2000 and 2001, but they were equal in 2002 (3.6 days). The average hospital charge claimed for a primary diagnosis of DKA was \$8,144 (2000-2002). Table 5 shows the number of hospitalizations for DKA (primary or secondary diagnosis) by ADD for each year, as well as the percentage of DKA as a proportion of all diabetes-related hospitalizations (primary or secondary diagnosis) in each ADD. In most ADDs, the proportion of DKA hospitalizations showed only slight variation over the three years. However, the Northern KY ADD showed a substantial increase in hospitalizations due to DKA, increasing from 122 (2.8%) in 2000 to 264 (3.5%) in 2002.

Table 5.
Hospitalizations for DKA (Primary or Secondary Diagnosis), by ADD
Kentucky 2000-2002

ADD	Number (Percent of diabetes-related hospitalizations*)		
	2000	2001	2002
Barren River	109 (2.2%)	122 (2.2%)	126 (2.1%)
Big Sandy	133 (2.5%)	137 (2.5%)	142 (2.4%)
Bluegrass	323 (3.4%)	382 (3.5%)	378 (3.2%)
Buffalo Trace	34 (2.9%)	35 (2.8%)	31 (2.3%)
Cumberland Valley	151 (2.0%)	183 (2.3%)	208 (2.5%)
FIVCO	96 (2.3%)	134 (3.1%)	89 (2.0%)
Gateway	42 (3.2%)	59 (3.7%)	52 (3.3%)
Green River	72 (1.8%)	78 (1.7%)	104 (2.0%)
Kentucky River	102 (2.2%)	128 (2.4%)	145 (2.6%)
KIPDA	448 (2.9%)	543 (3.1%)	639 (3.4%)
Lake Cumberland	98 (1.9%)	133 (2.4%)	128 (2.3%)
Lincoln Trail	87 (2.5%)	138 (3.3%)	108 (2.4%)
Northern KY	122 (2.8%)	177 (2.5%)	264 (3.5%)
Pennyrile	83 (2.2%)	107 (2.4%)	110 (2.3%)
Purchase	101 (2.2%)	110 (2.2%)	115 (2.4%)
STATE TOTAL	2,001 (2.5%)	2,466 (2.7%)	2,639 (2.7%)

Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

*Diabetes as primary or secondary diagnosis

Non-traumatic Lower Extremity Amputations

The risk of non-traumatic lower extremity amputations (LEA) is significant for individuals with diabetes. Sensory, autonomic and motor neuropathies can all act together to cause foot complications which can lead to ulcerations and amputation. In people who have had diabetes for approximately 15 years, about half will have a loss of protective sensation that could allow even minor trauma to go unnoticed by the individual.⁴ More than half of all non-traumatic LEAs performed in the US occur in persons with diagnosed diabetes.⁵ About half of diabetes-related amputations can be prevented through proper foot care and reducing risk factors such as high blood sugar (glucose), cigarette smoking, and high blood pressure.⁶ Proper foot care includes checking the feet every day (look for sores, blisters, broken skin, and changes in color or warmth), keeping them clean and smooth, wearing shoes that fit well, wearing socks, protecting feet from heat and cold, carefully trimming toenails, and having a health care provider conduct a professional foot exam at least once a year.

Kentucky Inpatient Hospitalization Claims data showed a total of 5,355 non-traumatic LEAs were performed during 2000-2002. Nearly two-thirds (65.7%) of the LEAs were related to diabetes, accounting for 3,518 amputations. This percentage was fairly stable over the three-year period. LEAs related to diabetes were more often performed on males (59.1%) than females (40.9%). Table 6 shows the number of diabetes-related LEAs (primary or secondary diagnosis) each year by ADD, as well as the percentage of LEAs as a proportion of the diabetes-related hospitalizations (primary or secondary diagnosis) in each ADD.

The 45-64 age group had the highest percentage of LEAs related to diabetes, accounting for 41.1% (Figure 6). However, when the age groups of 65-74 and 75+ are combined, they accounted for over half (51.3%) of the amputations, for a total of 1,805. Although the percentage of diabetes-related LEAs in the younger age group (25-44) was considerably smaller (7.5%) than the older age groups, this percentage translates into 263 amputations among rather young Kentuckians. In addition, during 2000, there were three males in the 15-24 age group who incurred a diabetes-related LEA.

Most lower extremity amputations can be delayed or avoided. Proper foot care practices and regular, professional foot examinations are encouraged for people with diabetes.

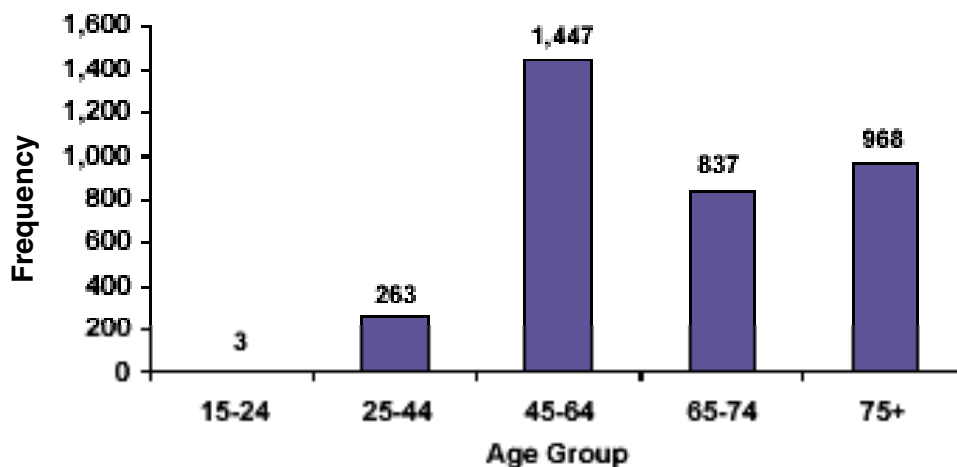
Table 6.
Diabetes-Related LEAs (Primary or Secondary Diagnosis), by ADD
Kentucky 2000-2002

ADD	Number (Percent of diabetes-related hospitalizations*)		
	2000	2001	2002
Barren River	79 (1.6%)	93 (1.7%)	89 (1.5%)
Big Sandy	63 (1.2%)	49 (.89%)	56 (.97%)
Bluegrass	156 (1.6%)	169 (1.5%)	166 (1.4%)
Buffalo Trace	20 (1.7%)	27 (2.2%)	13 (.97%)
Cumberland Valley	65 (.87%)	59 (.72%)	48 (.59%)
FIVCO	39 (.94%)	37 (.86%)	29 (.65%)
Gateway	27 (2.0%)	27 (1.7%)	17 (1.1%)
Green River	45 (1.1%)	52 (1.1%)	50 (.97%)
Kentucky River	55 (1.2%)	38 (.72%)	38 (.67%)
KIPDA	281 (1.8%)	280 (1.6%)	273 (1.5%)
Lake Cumberland	45 (.89%)	50 (.90%)	62 (1.1%)
Lincoln Trail	63 (1.8%)	73 (1.7%)	90 (2.0%)
Northern KY	68 (1.6%)	101 (1.4%)	105 (1.4%)
Pennyrile	65 (1.7%)	69 (1.5%)	76 (1.6%)
Purchase	70 (1.5%)	73 (1.5%)	68 (1.4%)
STATE TOTAL	1,141 (1.4%)	1,197 (1.3%)	1,180 (1.2%)

Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

*Diabetes as primary or secondary diagnosis

**Figure 6. Diabetes-related Lower Extremity Amputations
by Age Group
Kentucky 2000-2002**



Source: Kentucky Inpatient Hospitalization Claims;
Kentucky Department for Public Health, Health Policy Development Branch

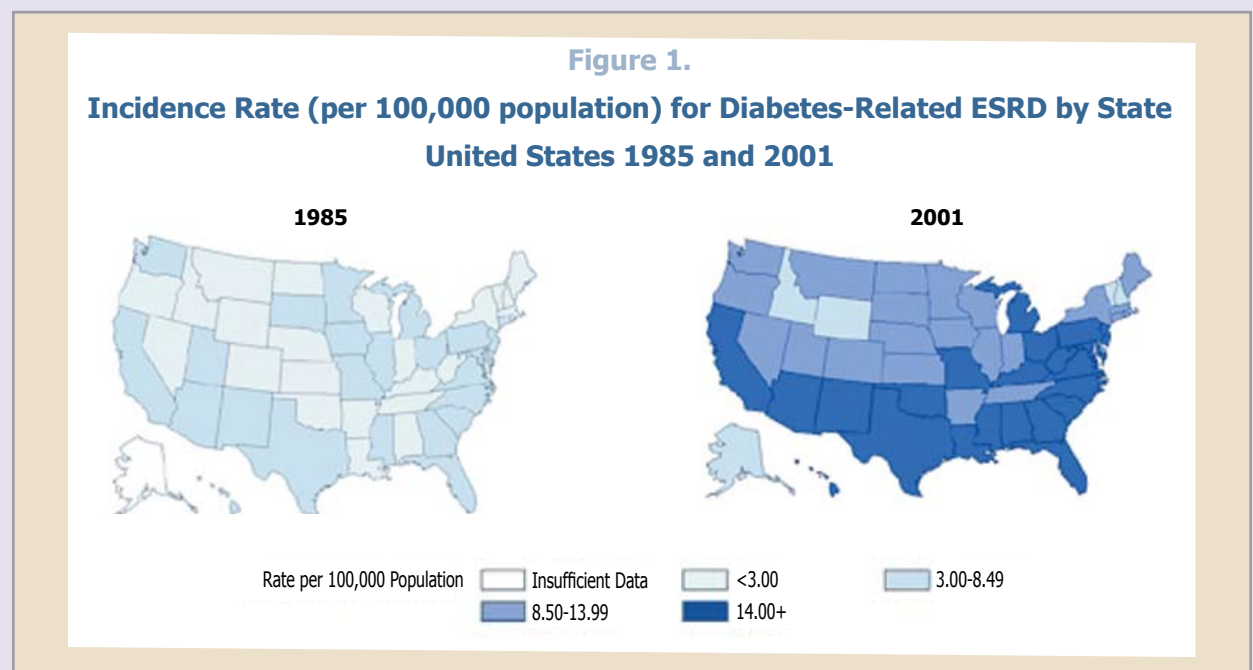
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End-Stage Renal Disease

End-Stage Renal Disease (ESRD) occurs when kidney damage is so severe that dialysis therapy or a kidney transplant is required to sustain life. Data for ESRD were obtained from two sources: United States Renal Data System (USRDS) and The Renal Network, Inc. (Please see the Technical Notes for a further description of these sources.)

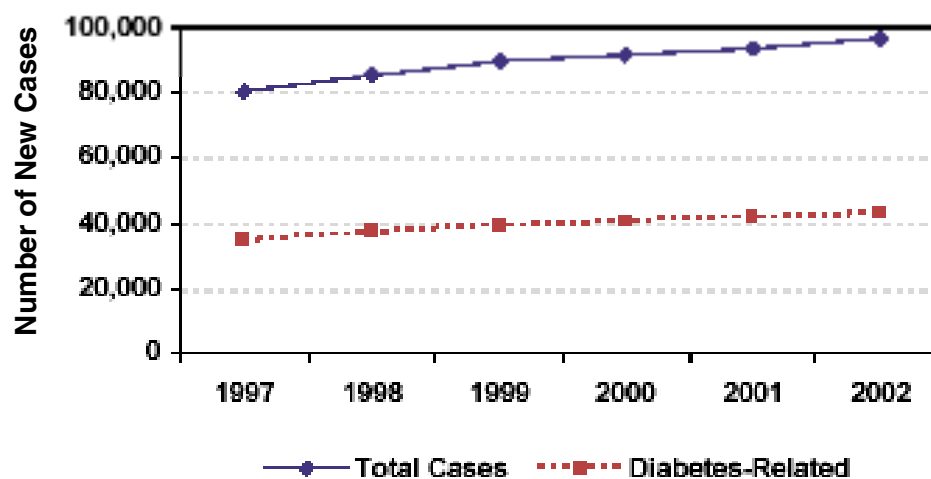
Diabetes is the leading cause of ESRD. The maps in Figure 1 show the remarkable difference in incidence rates of diabetes-related ESRD among the states between 1985 and 2001. Kentucky had a rate of <3.0 per 100,000 population in 1985, but the rate rose to ≥ 14.0 by 2001.



Source: Centers for Disease Control and Prevention, Diabetes Public Health Resource¹

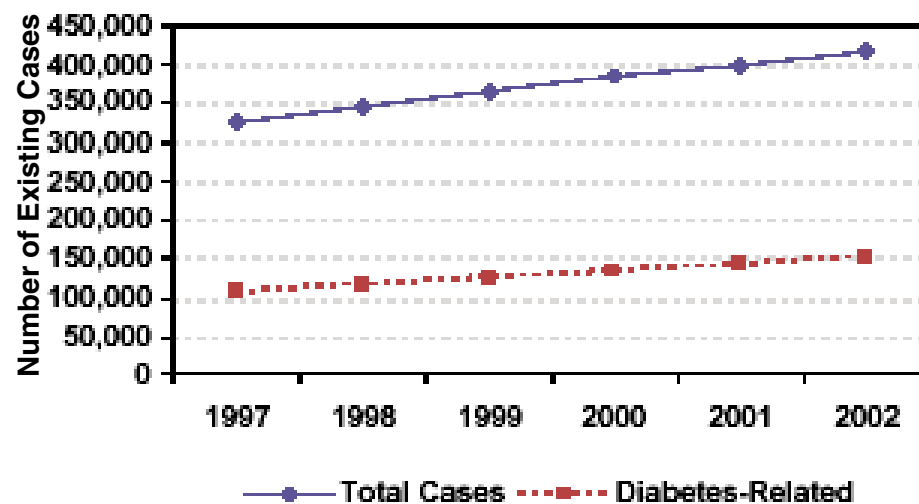
The number of new cases, or the incidence, of diabetes-related ESRD in the United States climbed from 34,706 in 1997 to 42,665 in 2002 (Figure 2). The number of existing cases, or the prevalence, of ESRD in the United States has been steadily increasing, with over 419,000 total cases in 2002 of which nearly 150,000 were related to diabetes (Figure 3). During 1997-2002, about 44% of new cases and 36% of existing cases of ESRD were diabetes-related each year.

**Figure 2. Incidence of ESRD
United States 1997-2002**



Source: US Renal Data System²

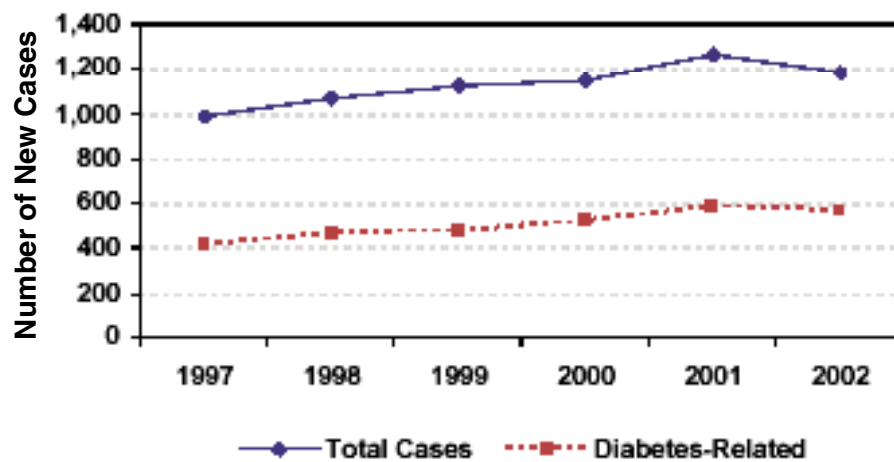
**Figure 3. Prevalence of ESRD
United States 1997-2002**



Source: US Renal Data System²

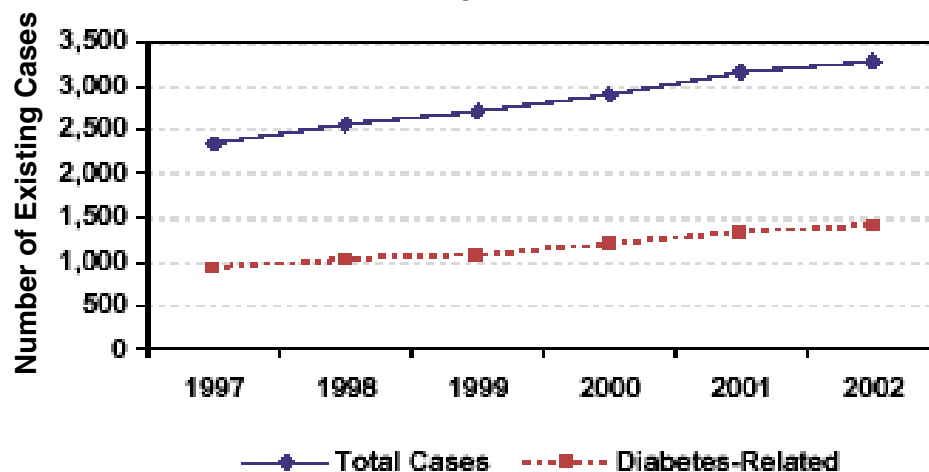
The number of new cases of ESRD related to diabetes in Kentucky increased from 415 cases in 1997 to 584 cases in 2001, but decreased to 562 cases in 2002 (Figure 4). From 1997 through 2002, diabetes accounted for 45% of all new cases of ESRD in Kentucky. The prevalence of ESRD attributable to diabetes increased in Kentucky from 916 cases in 1997 to 1,409 cases in 2002. During this time period, diabetes accounted for 41% of all existing cases of ESRD (Figure 5).

**Figure 4. Incidence of ESRD
Kentucky 1997-2002**



Source: The Renal Network, Inc.

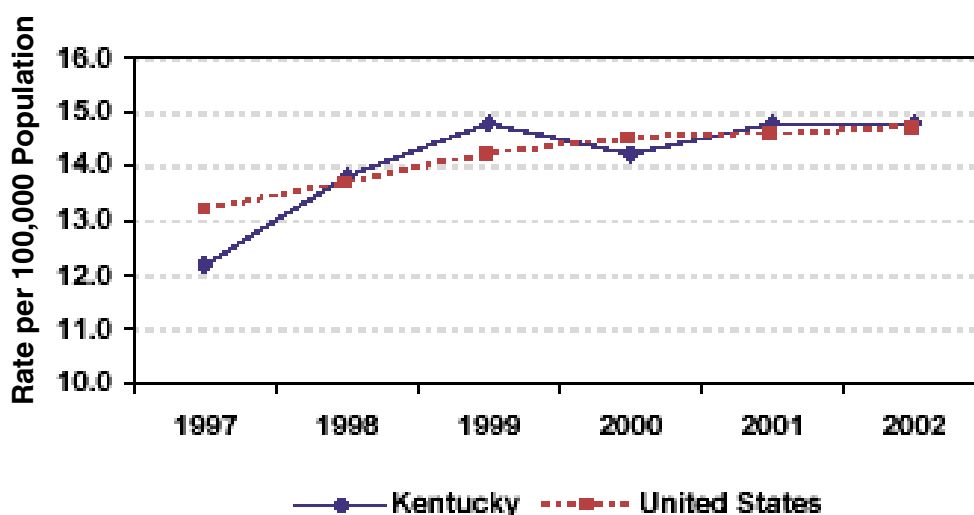
**Figure 5. Prevalence of ESRD
Kentucky 1997-2002**



Source: The Renal Network, Inc.

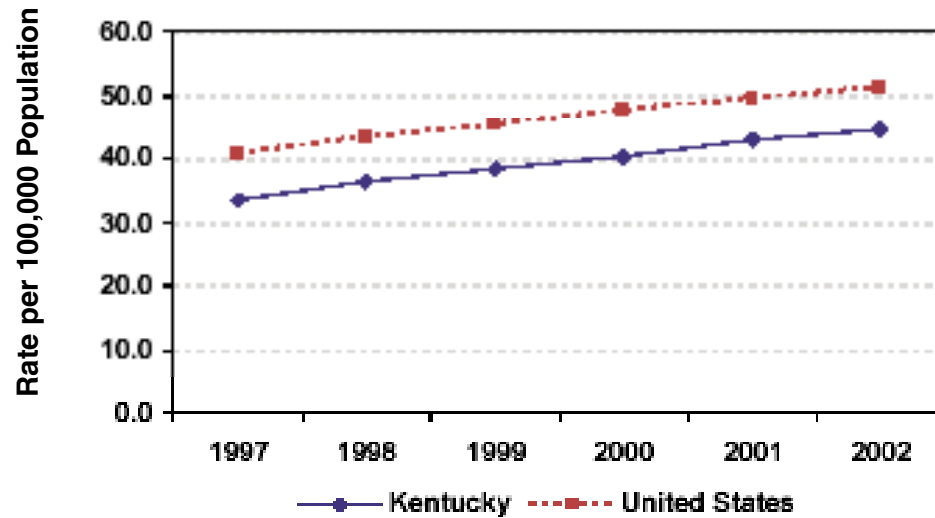
In Kentucky, incidence rates for diabetes-related ESRD among the general population increased from 12.2 per 100,000 in 1997 to 14.8 in 2001 and 2002 (Figure 6). The Kentucky rates were similar to the US during this time period. The prevalence of diabetes-related ESRD in Kentucky increased from 33.6 per 100,000 population in 1997 to 44.6 in 2002, but Kentucky had a lower prevalence rate than the United States for each year (Figure 7).

**Figure 6. Age-Adjusted Incidence Rates for
Diabetes-Related ESRD
Kentucky and United States 1997-2002**



Source: US Renal Data System²

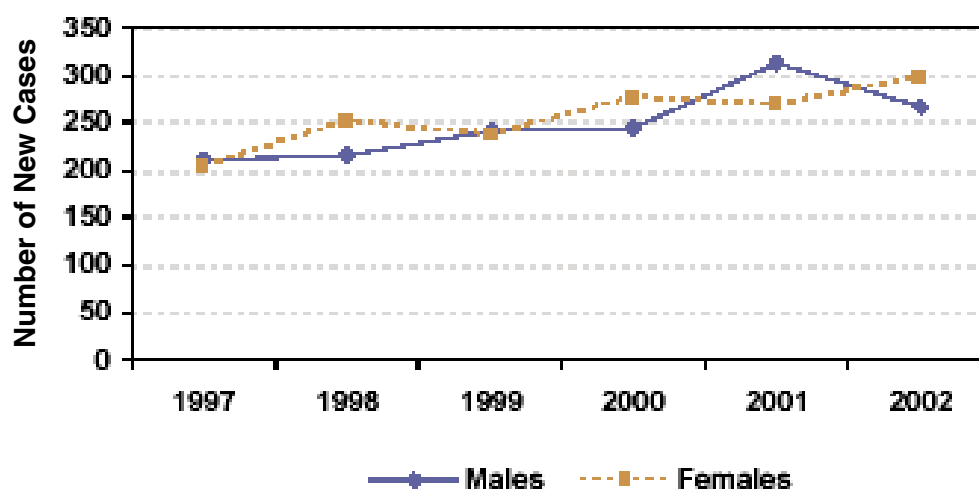
**Figure 7. Prevalence Rates for
Diabetes-Related ESRD
Kentucky and United States 1997-2002**



Source: US Renal Data System²

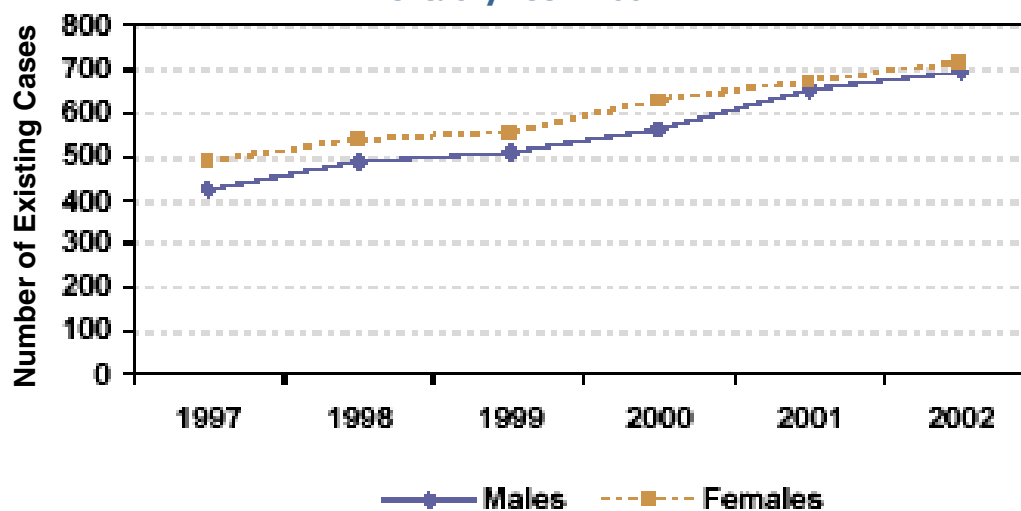
Figure 8 shows the number of new cases (incidence) of diabetes-related ESRD during 1997-2002 in Kentucky for males and females. Although the incidence for both males and females increased during the six-year period, there was no clear pattern over time. Figure 9 shows the number of existing cases (prevalence) of diabetes-related ESRD for males and females for the same six-year period. Females had a slightly higher prevalence each year. (Adjusted incidence and prevalence rates by gender were not available.)

**Figure 8. Incidence of Diabetes-Related ESRD, by Gender
Kentucky 1997-2002**



Source: The Renal Network, Inc.

**Figure 9. Prevalence of Diabetes-Related ESRD, by Gender
Kentucky 1997-2002**



Source: The Renal Network, Inc.

Persons residing in the Appalachian area of the state accounted for 28.6% of the new cases (incidence) of ESRD and 30.6% of new diabetes-related ESRD cases during 1997-2002 combined; the percentages were fairly steady over the six-year period. These percentages are in proportion to the population that reside in Kentucky's Appalachian counties (28%). A similar pattern followed for existing cases (prevalence) of ESRD. For 1997-2002, Appalachian residents accounted for 25.5% of the total ESRD prevalence and 27.6% of the diabetes-related ESRD prevalence; again, the percentages varied little over the six years.

The number of patients being treated for ESRD as of December 31, 2002 (the prevalence) in each Area Development District (ADD) is shown in Table 1. Statewide, 43% of the ESRD cases were related to diabetes. Buffalo Trace had the highest percentage of diabetes-related cases (54%) while Barren River had the lowest (32%).

Table 1. Prevalence of ESRD Patients as of 12-31-2002, by ADD

ADD	Number of Diabetes- Related ESRD Patients	Percent of Total ESRD Patients	Total Number of ESRD Patients
Buffalo Trace	27	54%	50
Gateway	24	44%	55
Kentucky River	52	48%	108
FIVCO	58	52%	111
Barren River	40	32%	125
Lake Cumberland	49	39%	126
Big Sandy	70	48%	146
Cumberland Valley	68	47%	146
Lincoln Trail	81	49%	167
Purchase	86	44%	196
Green River	73	37%	197
Pennyrile	93	44%	211
Northern KY	144	50%	290
Bluegrass	222	43%	521
KIPDA	311	38%	826
STATE TOTAL	1,398	43%	3,275

Note: Cases with unknown counties of residence were omitted

The prevalence of diabetes-related ESRD has been steadily increasing in the US as well as Kentucky, accounting for about 41% of the total ESRD cases in Kentucky. Because the prevalence of diabetes in Kentucky has been increasing, we can expect this trend in ESRD to continue. Healthy Kentuckians 2010 set a goal to decrease the incidence of ESRD due to diabetes to no more than 11.3 per 100,000 population.³ With an incidence rate of 14.8 per 100,000 in 2002, Kentucky has not yet met this goal.

References

1. Centers for Disease Control and Prevention, Diabetes Public Health Resource. <http://www.cdc.gov/diabetes/statistics/esrd/mStateFigures.htm>
2. US Renal Data System. 2004 Annual Data Report www.usrds.org
3. Kentucky Department for Public Health, Division of Epidemiology and Health Planning. Healthy Kentuckians 2010. http://chs.state.ky.us/publichealth/healthy_ky_2010.htm

Technical Notes and Data Sources

Behavioral Risk Factor Surveillance System

The Kentucky Behavioral Risk Factor Surveillance System (BRFSS) is a population-based telephone survey developed by the Centers for Disease Control and Prevention (CDC). The survey has been administered by the Kentucky Department for Public Health since 1985. The survey is randomly administered to non-institutionalized adults (ages 18 and older) who are living in homes with a telephone. No personal identifiers are collected. The number of completed interviews has increased each year and approximately 7,500 respondents participated in the survey in 2001.

Since 1994, the Kentucky BRFSS has contained a 12-question diabetes module in addition to the core component questions of the survey. Each participant is asked the question, "Have you ever been told by a doctor that you have diabetes?" If the respondent answers "yes," the diabetes module is administered. Prevalence estimates are derived from the core questions and the module. Multiple years of data were combined to provide an adequate sample size for the analysis of the module questions.

The BRFSS is a self-reported survey and therefore the following data-related issues should be kept in mind when interpreting results:

- Self-reported responses are subject to recall bias.
- Data are weighted to adjust for the selection probabilities, non-response rates, non-telephone coverage, and gender/age/race distribution of Kentucky as estimated in the census projection provided by the CDC.
- Individuals <18 years of age, institutionalized, or inaccessible by telephone are excluded from the survey.
- Rates for the Hispanic, Native American, and Asian Americans/Pacific Islander populations are not included due to inadequate population size for analysis.
- The accuracy of prevalence estimates is limited due to the reliance on self-report of diabetes status.

In addition, it is important to note that the analysis of the BRFSS data in this section excluded respondents who reported having diabetes that was pregnancy-related (gestational); therefore, the results presented here represent only respondents who reported having types 1 and 2 diabetes.

Further information about the BRFSS can be found at

<http://chs.ky.gov/publichealth/BRFSS.htm> and <http://www.cdc.gov/brfss/>.

Kentucky State Vital Statistics

Mortality data (including number of deaths and rates) were obtained from the Surveillance and Health Data Branch at the Kentucky Department for Public Health. Cause of death is obtained from the underlying cause of death as listed on Kentucky death certificates. Mortality rates are age-adjusted to the year 2000 standard estimated US population.

Limitations exist with death certificate data and should be acknowledged when interpreting results. First, problems exist in the completion of death certificates as well as the accuracy of completed information on the certificate. Interpretation of mortality causal events may differ, which could lead to inaccurate diagnosis and variation in coding the underlying cause of death. Also, determining one specific underlying cause of death among decedents with multiple chronic diseases can become problematic since the etiologic sequence of diseases may be unclear, and one single disease may not adequately describe the cause of death. If diabetes is listed as a cause of death, the distinction whether it is type 1 or type 2 is not made.

It is important to note that in 2002 special diabetes-related items were added to the Kentucky death certificate which may have influenced the frequency of diabetes being determined as the underlying cause of death. Thus, caution should be used when interpreting these data and in comparing 2002 data to previous years.

Kentucky Hospitalization Claims Data

The Kentucky Inpatient and Outpatient Hospitalization Claims databases provide a method to collect, analyze, and disseminate information regarding hospital health care services statewide. As required by KRS 216.2920-216.2947, hospitals and hospital-based outpatient clinics submit selected data elements from billing data to the Cabinet for Health and Family Services, Health Policy Development Branch. The data presented in this report include only hospital inpatient services. The current databases include submissions from the approximately 125 licensed acute care, psychiatric, and rehabilitation facilities in the Commonwealth. The compliance rate among contributing facilities (percent of total discharges included in the databases) has risen steadily from approximately 95% in 2000 to over 99% at the present time. Each record in the databases includes patient gender, age group, county of residence, diagnosis and procedure codes, claimed charges, admission and discharge status, and payer information. However, patient race and/or ethnicity information is not collected on admission to hospitals or clinics and is therefore not included in these data.

End-Stage Renal Disease Data

Data for end-stage renal disease (ESRD) were obtained from two sources: United States Renal Data System (USRDS) and The Renal Network, Inc.

Kentucky data for 1997-2002 were obtained from The Renal Network, Inc., and only reflect those patients treated in Kentucky. The Renal Network, Inc. is a not-for-profit organization which monitors quality of dialysis care in the states of Indiana, Kentucky, Ohio (Network 9), and Illinois (Network 10). A total of 18 ESRD Networks throughout the country provide oversight of dialysis and transplant centers. ESRD Networks are funded through the Centers for Medicare and Medicaid Services (CMS). Data are gathered on a continual basis from Network facilities to track and monitor all chronic renal patients. For further information about The Renal Network, Inc., visit <http://www.therenalnetwork.org>.

The USRDS is a national data system that collects, analyzes, and distributes information about ESRD in the United States. The USRDS is funded directly by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) in conjunction with the Centers for Medicare & Medicaid Services (CMS). USRDS staff collaborates with members of CMS and the ESRD Networks, sharing datasets and actively working to improve the accuracy of ESRD patient information. For further information on the USRDS, visit <http://www.usrds.org/>.

Incidence of ESRD is defined as the number of newly diagnosed patients initiating treatment for ESRD as of December 31st for the specific calendar year. Prevalence of ESRD is defined as the total number of patients undergoing treatment for ESRD as of December 31st for that specific calendar year.

ESRD incidence and prevalence rates for Kentucky and the US were obtained from the USRDS 2004 annual report. **When interpreting these rates it is important to note** that they show only the risk among the general population regardless of diabetes status or risk developing diabetes. Because we only have self-reported estimates of the prevalence of diabetes in Kentucky from the BRFSS, the exact number of new and existing cases of diabetes in the Commonwealth is unknown. Thus, incidence rates cannot be calculated using the BRFSS data and a prevalence rate based on the BRFSS estimates would be unreliable.

Age Adjustment to Year 2000

Age-standardization, or age-adjustment, is one of the key tools used to control for the changing age distribution of the population thereby allowing meaningful comparisons of rates over time and between groups. Age-adjusted rates eliminate the bias of age in the makeup of the populations being compared, which provides a much more reliable rate for comparison purposes. The age structures of the populations for the 1940 and 2000 standards differ. For example, the US population has “aged” considerably from 1940 to 2000 resulting in a higher concentration of population in the middle and older age groups, such as between 35 to 45 years of age and 65 years of age and over for the year 2000. Due to these population differences, and the “weights” that are assigned to the various age groups, the rates standardized to these two different years are not comparable. Rates provided within this document are adjusted to the 2000 standard population estimates, and therefore, are not comparable to age-adjusted rates calculated before implementation to the year 2000 standard.

Glossary

Age-adjusted death rate: The death rate that would occur if the observed age-specific death rates were present in a population with an age distribution equal to that of a standard population. It is calculated by taking the total number of expected deaths in a standard population x 100,000, divided by the total standard population (based on the 2000 U.S. standard population).

Crude death rate: The number of deaths in a population divided by the estimated total population, multiplied by a constant, usually 100,000.

Incidence: The number of new cases of a disease or other event occurring during a given time period. Incidence rate is a measure of the frequency of the occurrence in a given population at risk for the event during a specified period. It is calculated with the number of new cases as the numerator and the population at risk for being a case is the denominator. It is often multiplied by a constant, such as 1,000 or 100,000.

Morbidity: Refers to the illness or some other morbid condition. It does not refer to death.

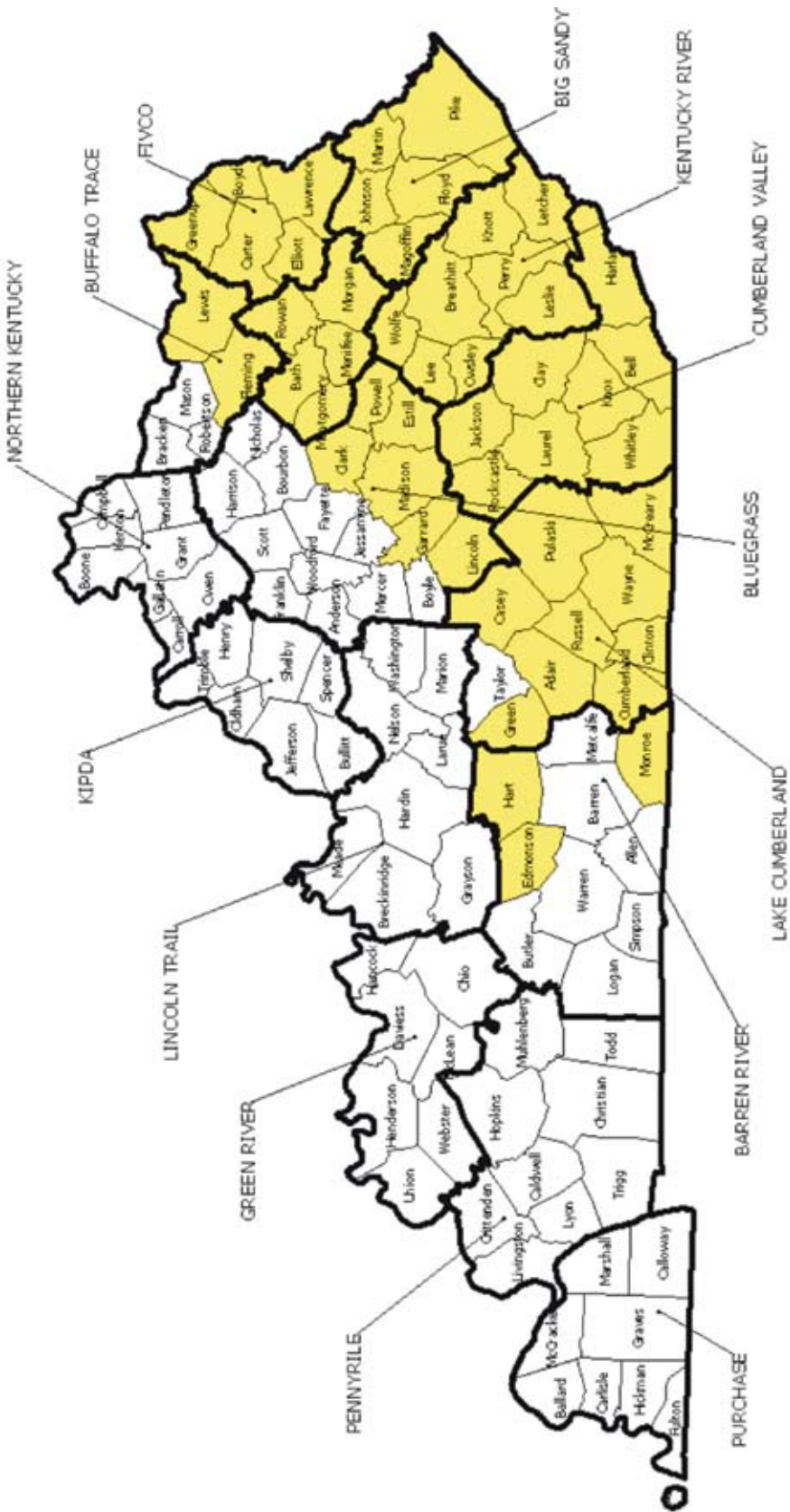
Mortality: Refers to death. Mortality data is usually gathered through death certificates.

Prevalence: The number of cases of a disease or other event that exists at a specified time or during a specified time period. Prevalence rate is the proportion of persons in a population who have the disease or condition at a specified time or time period. It is calculated with the number of existing cases as the numerator and the population at risk for being a case as the denominator. It is often multiplied by a constant, such as 1,000 or 100,000.

Rate: A mathematical calculation which places all the events of interest (the numerator) over the total population in which the event could occur (the denominator) and multiplying by a constant, such as 100 or 100,000. This allows for comparisons between groups.

Risk factor: A behavior or characteristic that increases the probability that an individual will contract a specific disease or condition.

Kentucky Map with Area Development Districts





FACT SHEETS

Kentucky Diabetes Fact Sheet

2005

DIABETES IS COMMON IN KENTUCKY

- In 2003, an estimated **8.5%** of the adult population in Kentucky has been diagnosed with diabetes. This means that an estimated 267,000 adults in Kentucky have diagnosed diabetes, based on the 2003 Census population estimate. It is estimated that 29% of diabetes cases are undiagnosed, which means that an additional 109,000 Kentucky adults may have undiagnosed diabetes. Based on these estimates, approximately 376,000 (about 12%, or 1 in 8) adult Kentuckians have diagnosed or undiagnosed diabetes.
- Kentucky ranks 7th (tied with two other states) in the nation for the highest percentage of the adult population diagnosed with diabetes. (2003)

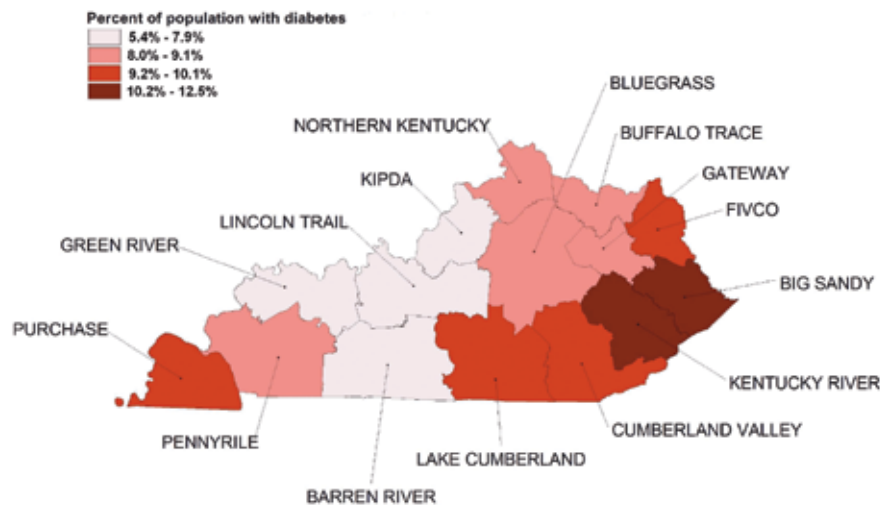
Kentucky Adults with Diagnosed Diabetes, by Gender and by Race, 2003

Gender	Percent	Race	Percent
Males	9.9%	Black	13.4%
Females	7.3%	White	8.3%

Kentucky Adults with Diagnosed Diabetes, by Age, 2003

Age	<45	45-54	55-64	65+
Percent	2.7%	9.8%	17.2%	17.5%

Adults with Diagnosed Diabetes, by Area Development District, 2003



Barren River	5.4%	FIVCO	10.1%	Lake Cumberland	9.8%
Big Sandy	12.5%	Gateway	8.8%	Lincoln Trail	7.9%
Bluegrass	8.6%	Green River	6.6%	Northern KY	9.1%
Buffalo Trace	8.0%	KY River	11.2%	Pennyryle	9.1%
Cumberland Valley	10.1%	KIPDA	7.3%	Purchase	9.3%

AT RISK FOR DIABETES

- An estimated **611,000 (40.1%)** Kentuckians aged 40-74 have **pre-diabetes** (elevated blood sugar levels but not high enough to be classified as diabetes) and are at **very high risk** for developing the disease.
 - 30.6%** of adult Kentuckians report that they **did not participate in any physical activity** in the past month. Kentucky has the highest percentage of any state for lack of physical activity. (2003)
 - 25.6%** of adult Kentuckians (**about 1 in every 4**) are **obese**, based on reported height and weight. Kentucky ranks 5th among the states for highest prevalence of obesity. (2003)

DIABETES IS A SERIOUS DISEASE IN KENTUCKY

- Diabetes is the 6th leading cause of death in Kentucky and the 5th leading cause of death by disease. (2002)
- There were 96,320 diabetes-related hospitalizations in Kentucky in 2002, accounting for 16.5% of the total hospitalizations. During 2002:
 - 2,639 hospitalizations due directly to diabetic ketoacidosis
 - 1,180 hospitalizations for lower extremity amputations due to diabetes
 - 3,096 hospitalizations due to cerebrovascular disease with diabetes
 - 11,017 hospitalizations due to ischemic heart disease with diabetes
 - 562 new cases of end-stage renal disease related to diabetes
- Among persons with diabetes
 - 26% report that diabetes affects their eyes or have retinopathy (2003)
 - 13% report that they had foot ulcers that took more than four weeks to heal (2003)

DIABETES IS A COSTLY DISEASE IN KENTUCKY

- The cost of diabetes in Kentucky is staggering. The direct cost (medical care) and indirect cost (lost of productivity and premature mortality) of diabetes in Kentucky totaled approximately **\$2.9 billion** in 2002.

DIABETES IS A CONTROLLABLE DISEASE

- Much of the sickness and death associated with diabetes can be eliminated through treatment approaches including normalization of blood glucose levels, routine physician visits, self-management training, a yearly dilated eye exam, routine foot exams, and A1C checks.
- Reported preventive care practices among adults with diabetes in Kentucky and the nation are shown in the table below.

Reported Preventive Care Practices Among Adults with Diabetes, Kentucky 2000-2003

Preventive Care Practice	Kentucky				US
	2000	2001	2002	2003	2003
Saw a health professional for diabetes ≥ 1 time in the past year	94%	95%	94%	94%	90%
Ever taken a course or a class in how to manage diabetes	46%	47%	46%	43%	51%
Checked blood glucose ≥ 1 time per day	55%	58%	64%	64%	57%
Received a dilated eye exam in the past year	76%	71%	75%	66%	67%
Received a foot exam ≥ 1 time in the past year	63%	64%	62%	64%	69%
Received a flu vaccination in the last year*	--	52%	52%	57%	56%
Ever received a pneumonia vaccine*	--	40%	39%	48%	48%
Had A1C checked ≥ 1 time in the past year	62%	67%	72%	75%	76%
"Don't Know" or "Never Heard of A1C"	25%	23%	21%	15%	14%

Source: Behavioral Risk Factor Surveillance System

*Question not included in 2000 survey

*Diabetes is a **common, serious, costly, and controllable** disease that affects thousands of individuals in Kentucky and poses a major public health concern.*

Data Sources: Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention (CDC); undiagnosed diabetes estimation based on prevalence in the general population, CDC, *MMWR* 52(35): 833-837; pre-diabetes estimate based on national estimate, CDC, National Diabetes Fact Sheet; mortality data from Surveillance and Health Data Branch, KY Department for Public Health; Hospitalization Claims Data, Health Policy Analysis Branch, KY Department for Public Health; ESRD data from The Renal Network, Inc.; diabetes cost from Agency for Healthcare Research and Quality.



DIABETES IN KENTUCKY AFRICAN AMERICANS

2005

DIABETES IS A COMMON DISEASE

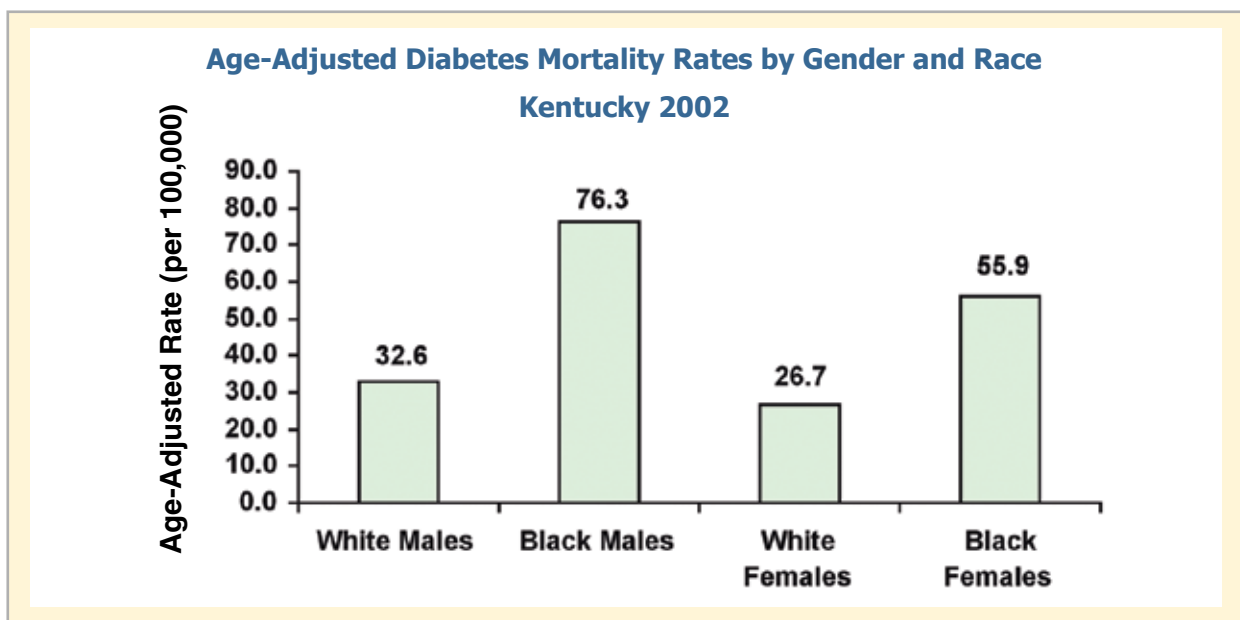
- In general, African Americans have a higher prevalence of diabetes than Whites, and this is true in Kentucky. An estimated **13.4%** of the adult African American population in Kentucky has diabetes. The rate of diagnosed diabetes is **1.6 times higher** in African American Kentuckians than White Kentuckians.
- In 2002, diabetes was the 6th leading cause of death in Kentucky, but it was the **4th leading cause of death among African Americans in Kentucky**. (Diabetes has moved up from the 5th leading cause in 2001.)

Kentucky Adults with Diagnosed Diabetes, 2003

Race	Percent
Black	13.4%
White	8.3%

*The number of respondents who indicated a race other than White or Black was too few to be analyzed separately. Hispanic ethnicity is not analyzed separately.

- Mortality rates due to diabetes are higher among the African American population than the White population in Kentucky. In fact, the age-adjusted death rate due to diabetes for African Americans (64.9 per 100,000) in 2002 was more than twice the comparable rate for the White population (29.4).
- Notable differences can be seen in the death rates for males and females grouped by race. In 2002, the diabetes mortality rate for Black males was 2.3 times that of White males, while the death rate for Black females was about twice that of White females.



DIABETES IS A CONTROLLABLE DISEASE

- Much of the sickness and death associated with diabetes can be eliminated through treatment approaches to normalize blood glucose levels including routine physician visits, self-management training, yearly dilated eye exams, routine foot exams, and A1C checks.
- The table below shows the preventive care practices reported by individuals with diabetes. Improvement has been shown in diabetes care disparities in the African American population compared to the White population. A higher percentage of Blacks than Whites reported ever taking a course in self-management, and having a dilated eye exam and foot exam in the past year. For many of the preventive care practices shown below, there are no large differences between the White and Black populations.

**Preventive Care Practices of Adults Diagnosed with Diabetes,
Kentucky 2000-2003**

Preventive Care Practice	Statewide		White		Black	
	2000 2001	2002 2003	2000 2001	2002 2003	2000 2001	2002 2003
Saw a health professional for diabetes ≥ 1 time in the past year	95%	94%	94%	94%	100%	98%
Ever taken a course or a class in how to manage diabetes	46%	44%	44%	44%	58%	53%
Checked blood glucose ≥ 1 time per day	56%	64%	55%	64%	65%	64%
Received a dilated eye exam in the past year	73%	70%	72%	69%	83%	88%
Received a foot exam ≥ 1 time in the past year	63%	63%	63%	62%	71%	79%
Received a flu vaccination in the last year*	52%	55%	52%	56%	54%	56%
Ever received a pneumonia vaccine*	40%	44%	42%	44%	29%	47%
Had A1C checked ≥ 1 time in the past year	65%	74%	66%	74%	61%	72%
"Don't Know" or "Never Heard of A1C"	24%	18%	23%	18%	27%	21%

*Question not included in 2000 survey

Data Sources: Kentucky Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention; mortality data from Surveillance and Health Data Branch, KY Department for Public Health

*Diabetes is a **common, serious, costly, and controllable** disease that affects thousands of individuals in Kentucky and poses a major public health concern.*



DIABETES IN APPALACHIA KENTUCKY

2005

DIABETES IS A COMMON DISEASE

- Of the adults residing in the Appalachian counties in Kentucky, **10.4%** have been diagnosed with diabetes. In comparison, 7.8% of the non-Appalachian Kentucky population has been diagnosed with diabetes. (2003)
- Residents of Appalachian counties had a slightly higher percentage of hospitalizations due to diabetes than in non-Appalachian residents: 18.1% and 15.8%, respectively. (2002)

DIABETES IS A CONTROLLABLE DISEASE

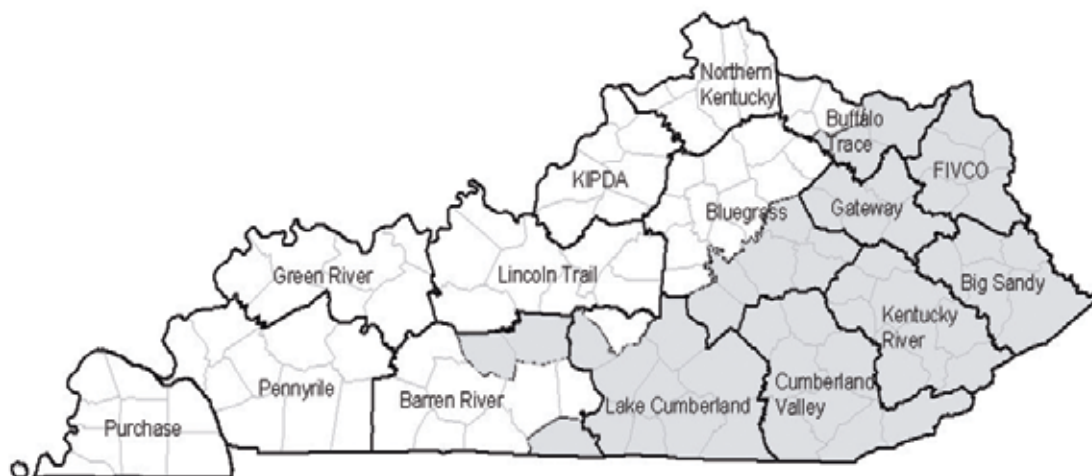
- Much of the sickness and death associated with diabetes can be eliminated through aggressive treatment approaches to normalize blood glucose levels including routine physician visits, self-management training, routine dilated eye exams, foot exams, and A1C checks.
- The table below shows the preventive care practices of individuals with diabetes in the Appalachian region and non-Appalachian region compared to Kentucky statewide. The residents of Appalachia are less likely their non-Appalachian counterparts to have taken a self-management course and to have received a dilated eye exam, flu vaccination, pneumonia vaccination and an A1C check. When asked whether they had an A1C blood check in the past year, a higher percentage of Appalachian residents responded that they either did not know or had never heard of A1C compared with the non-Appalachian residents, although the percentages for both groups improved from 2000-2001 to 2002-2003.

**Preventive Care Practices of Adults Diagnosed with Diabetes,
Kentucky 2000-2003**

Preventive Care Practice	Statewide		Non-Appalachia		Appalachia	
	2000 2001	2002 2003	2000 2001	2002 2003	2000 2001	2002 2003
Saw a health professional for diabetes ≥ 1 time in the past year	95%	94%	95%	94%	94%	94%
Ever taken a course or a class in how to manage diabetes	46%	44%	51%	48%	36%	38%
Checked blood glucose ≥ 1 time per day	56%	64%	56%	65%	58%	61%
Received a dilated eye exam in the past year	73%	70%	74%	76%	72%	59%
Received a foot exam ≥ 1 time in the past year	63%	63%	65%	64%	61%	61%
Received a flu vaccination in the last year*	52%	55%	55%	59%	45%	48%
Ever received a pneumonia vaccine*	40%	44%	43%	47%	35%	37%
Had A1C checked ≥ 1 time in the past year	65%	74%	68%	76%	59%	68%
"Don't Know" or "Never Heard of A1C"	24%	18%	21%	16%	29%	22%

*Question not included in 2000 survey

Map of Kentucky with Appalachia shaded



Data Sources: Kentucky Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention; Hospitalization Claims Data, Health Policy Analysis Branch, KY Department of Public Health

*Diabetes is a **common, serious, costly, and controllable** disease that affects thousands of individuals in Kentucky and poses a major public health concern.*



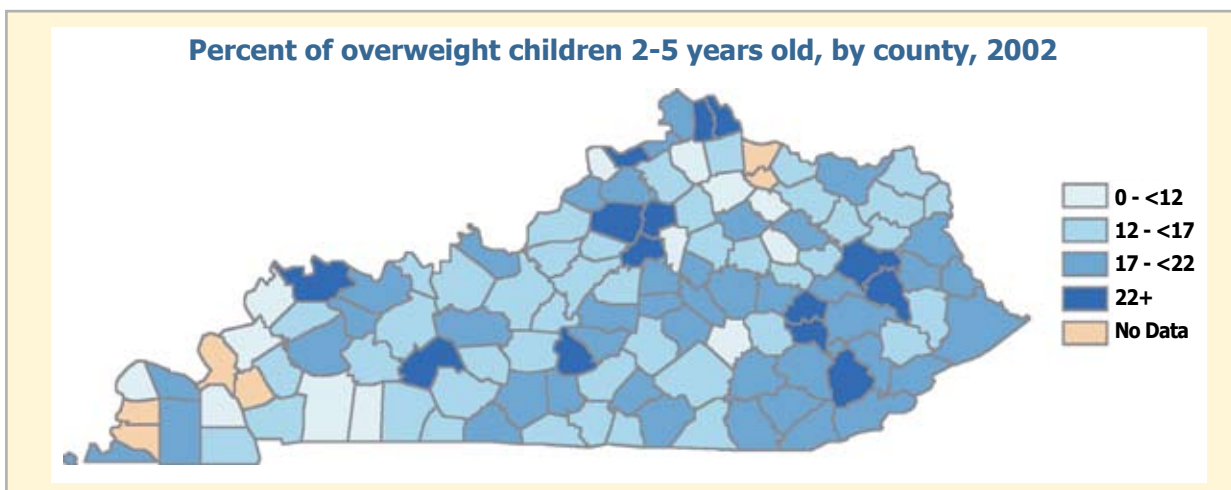
DIABETES IN CHILDREN AND ADOLESCENTS

2005

- According to national data, an estimated 206,000 individuals less than 20 years old have diabetes. This represents 0.25% of people in this age group. Applying this percentage to Kentucky's population under 20 (Census 2000) suggests that **approximately 2,800 children and adolescents may have diabetes**.
- Studies indicate type 2 diabetes is becoming more common among youth. This **increase in type 2 diabetes** at young ages is very concerning because it is a disease usually diagnosed in adults.

AT RISK FOR DIABETES: **Overweight, sedentary lifestyle**, and family history are risk factors for the onset of type 2 diabetes.

- National data indicate that the prevalence of **overweight among youth has been increasing**. In children (ages 6-11) the prevalence of overweight has more than doubled from 6.5% (1976-1980) to 15.3% (1999-2000). In adolescents (ages 12-19) the prevalence has tripled from 5.0% (1976-1980) to 15.5% (1999-2000).
- According to the Kentucky Youth Risk Behavior Survey (YRBS), which is conducted in a representative sample of public high schools, 15% of high school students reported a height and weight that indicates being overweight (2003).
- The national prevalence of overweight even in very young children (ages 2-5) has increased from 10.7% in 1993 to 14.3% in 2002. In Kentucky the prevalence of overweight among 2-5 year-olds was 16.8% in 2002, higher than the national prevalence.



- Sedentary lifestyle is common among Kentucky's youth. According to the YRBS, 79% of public high school students did not participate in sufficient moderate physical activity.

These trends indicate a continued rise in diabetes prevalence and other associated health problems unless drastic changes are made in the nutrition and exercise habits of children and adolescents.

Data Sources: Centers for Disease Control and Prevention, National diabetes fact sheet; general information and national estimates on diabetes in the United States, 2003; Kentucky Department of Education. Youth Risk Behavior Survey, 2003; National Center for Health Statistics. Health, United States, 2003; Centers for Disease Control and Prevention. Pediatric Nutrition Surveillance 2002 Report.

Diabetes is a **common, serious, costly, and controllable** disease that affects thousands of individuals in Kentucky and poses a major public health concern.



DIABETES IN KENTUCKY'S SENIOR CITIZENS

2005

DIABETES IS A COMMON DISEASE

- Although diabetes affects all age groups, it becomes more common with age. Of Kentucky's population age 65 and older, an estimated **17.5%** have been diagnosed with diabetes, compared with 6.7% for Kentuckians under age 65. (2003)

Kentucky Adults with Diagnosed Diabetes, by Age, 2003

Age	18-44	45-54	55-64	65+
Percent	2.7%	9.8%	17.2%	17.5%

DIABETES IS A CONTROLLABLE DISEASE

- Much of the sickness and death associated with diabetes can be eliminated through aggressive treatment approaches to normalize blood glucose levels including routine physician visits, self-management training, dilated eye exams, foot exams, and A1C checks.
- The table below shows the preventive care practices reported by individuals with diabetes in the older and younger age groups, compared with the statewide average. People in the older age group are more likely than their younger counterparts to have a dilated eye exam in the past year, and have flu and pneumonia vaccinations; however, the older age group is less likely to have taken a self-management course and to check blood glucose at least once a day and have an A1C blood check at least once in the past year. When asked whether they had an A1C check, a much higher percentage of older age group responded that they either did not know or had never heard of A1C compared with the younger age group.

Reported Preventive Care Practices Among Adults with Diabetes, Kentucky 2000-2003

Preventive Care Practice	Statewide		Age <65		Age 65+	
	2000 2001	2002 2003	2000 2001	2002 2003	2000 2001	2002 2003
Saw a health professional for diabetes ≥ 1 time in the past year	95%	94%	94%	93%	93%	91%
Ever taken a course or a class in how to manage diabetes	46%	44%	50%	47%	33%	25%
Checked blood glucose ≥ 1 time per day	56%	64%	57%	65%	45%	48%
Received a dilated eye exam in the past year	73%	70%	60%	66%	77%	77%
Received a foot exam ≥ 1 time in the past year	63%	63%	62%	62%	57%	56%
Received a flu vaccination in the last year*	52%	55%	41%	44%	73%	79%
Ever received a pneumonia vaccine*	40%	44%	27%	31%	79%	65%
Had A1C checked ≥ 1 time in the past year	65%	74%	70%	77%	55%	49%
"Don't Know" or "Never Heard of A1C"	24%	18%	18%	13%	29%	41%

*Question not included in 2000 survey

Data Sources: Kentucky Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention

Diabetes is a **common, serious, costly, and controllable** disease that affects thousands of individuals in Kentucky and poses a major public health concern.





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